241. We decline to impose site-by-site licensing for MSS base stations. This alternative to geographic area licensing of MSS ATC base stations would force MSS licensees and the Commission to spend considerable time and resources to assemble information that would hold little or no practical value in resolving coordination disputes that may arise.[642] While we must review and license ATC base stations individually in certain narrow circumstances to address public interest concerns, adopting an all-inclusive requirement for the individual licensing of every ATC base station does not serve the public interest and, in fact, would impose significant costs on the licensees and the Commission with little benefit to the public. Where, as here, the Commission has adopted technical limitations on adjacent-band and co-channel interference, individual licensing of transmission facilities neither decreases the likelihood of interference, nor accelerates resolution of a coordination dispute.[643] Indeed, the Commission has the authority to require the MSS licensee to terminate the base station's operations immediately, wherever located, and may impose sanctions on the licensee, including monetary forfeitures or license revocation, if appropriate.[644] In the past, moreover, the Commission has expedited licensing procedures in cases such as this one where administrative delays associated with traditional licensing schemes might prove "seriously detrimental" to provision of the proposed service.[645] In sum, the significant cost of individual licensing to the licensees and the Commission outweighs the limited benefits that might exist under these alternative regimes.

2. Foreign-Licensed MSS Providers

242. In 1997, to implement the World Trade Organization (WTO) Agreement on Basic Telecommunications (WTO Basic Telecom Agreement),[646] the Commission adopted the DISCO *II Order,* establishing procedures to evaluate applications by satellite systems licensed by other WTO-member countries to access the U.S. market.[647] Under the terms of the WTO Basic Telecom Agreement, seventy-eight WTO Members made binding commitments to open their markets to foreign competition in satellite services.[648] The United States, in particular, committed to open its satellite market to foreign systems

(Continued from previous page)

Inc. and Mobile Satellite Ventures Subsidiary LLC, File No. SAT-AMD-20010302-00019 (March 2, 2001)). To the extent that MSV has already paid the appropriate fee, MSV need only amend its pending application to conform its proposal to our requirements.

642 *See, e.g.*, MSV Comments at 29 ("Requiring individual licensing of these [ATC base station] facilities will be burdensome and unnecessary."); Constellation Comments at 30 ("individual licensing would place a heavy, unnecessary administrative burden on the Commission and MSS operators").

643 MSV Comments at 29.

644 47 C.F.R. §§ 1.80-1.95.

645 *See Amendment of Parts 21 and 74 to Enable Multipoint Distribution Service and Instructional Television Fixed Service Licensees to Engage in Fixed Two-way Transmissions.* Report and Order, 13 FCC Rcd 19112, 19146, ¶ 61 (1998) (adopting a certification procedure for ITFS and MDS that "dramatically expedite[s] the licensing process").

646 The WTO Basic Telecom Agreement was incorporated into the General Agreement on Trade in Services (GATS) by the Fourth Protocol to the GATS (April 30, 1996), 36 I.L.M. 336 (1997) (GATS Fourth Protocol).

647 *See Amendment of the Commission's Regulatory Policies to Allow Non-U.S. Licensed Space Stations to Provide Domestic and International Service in the United States.* Report and Order, 12 FCC Rcd 24094 (1997) (*DISCO II Order*).

648 GATS Fourth Protocol, 36 I.L.M. at 363; *see also DISCO II*, 12 FCC Rcd at 24102, ¶ 19. The United States made market access commitments for fixed and mobile satellite services. It did not make market access commitments for Direct-to-Home (DTH) Service, Direct Broadcast Satellite Service (DBS), and Digital Audio Radio Service (DARS), and took an exemption from most-favored nation (MFN) treatment for these services as well. *See* GATS Fourth Protocol, 36 I.L.M. at 359. Generally, GATS requires WTO member countries to afford (continued....)

licensed by WTO-member countries to provide fixed and mobile satellite services (excluding direct-to-home fixed satellite service). In its ***DISCO II*** Order implementing the WTO Basic Telecom Agreement, the Commission concluded that providing opportunities for non-U.S.-licensed satellites to deliver services in the United States would bring U.S. consumers the benefits of enhanced competition.[649] The Commission also found that this policy would promote greater opportunities for U.S. companies to enter previously closed foreign markets and stimulate a more competitive global satellite-services market.[650] In ***DISCO II***, the Commission said that requests to serve the U.S. market would be granted provided they are found to be in the public interest. In making this determination the Commission said that it would take into account factors such as competition in the United States, spectrum availability, eligibility requirements, technical requirements, and national security, law enforcement, foreign policy and trade issues."[651]

243. In our *Flexibility* Notice, we sought comment on authorizing foreign-licensed MSS providers to operate MSS ATCs within the United States by issuing or modifying existing declaratory orders, consistent with our existing ***DISCO II*** procedure.[652] We noted that, under ***DISCO II***, foreign-licensed MSS systems may tile a Letter of Intent (LOI) requesting that the Commission reserve spectrum so that a non-U.S.-licensed satellite system under development will have access to spectrum when it is completed. Such reserved spectrum is eventually licensed for use by the system's earth stations operating in the United States.[653] As an alternative to modifying a foreign-licensed MSS provider's declaratory order, we proposed to require foreign-licensed operators that provide MSS service in the United States, and wish to supplement their MSS signals using an ATC, to tile an appropriate earth station application.[654] This earth station application would merely demonstrate that the foreign-licensed MSS space segment operator meets our minimum eligibility criteria, including the minimum coverage requirements, applicable to U.S.-licensed MSS operators.[655]

244. TMI, a foreign-licensed MSS provider and one of the few commenters to address in detail the issue of how best to accommodate ATC in foreign-licensed MSS systems under our rules,

(Continued from previous page)
most-favored nation (MFN) treatment to all other WTO member nations. "With respect to any measure covered by this Agreement, each Member shall accord immediately and unconditionally to services and service suppliers of any other Member treatment no less favorable than that it accords to like services and service suppliers of any other country." GATS Article II, paragraph 1. Member nations are permitted to take "MFN exemptions," however, under certain circumstances specified in an annex to GATS. See GATS Annex on Article II Exemptions.

649 ***DISCO II Order,*** 12 FCC Rcd at 24097, ¶ 4.

650 ***Id.*** at 24099. ¶ 10.

651 ***Id.*** at 24100. ¶ 15.

652 ***Flexibility Notice.*** 16 FCC Rcd at 15554, ¶ 51. Under the ***DISCO II*** procedure, foreign-licensed MSS systems may file an LOI requesting that the Commission reserve spectrum so that the non-US-licensed satellite system may provide service in the United States through future-licensed earth stations that may or may not be ultimately licensed to the MSS provider. The LOI procedure was developed as part of the U.S. implementation of its market access commitments in the WTO Basic Telecom Agreement to avoid the need to issue separate (and duplicative) U.S. licenses for those space stations under the jurisdiction of another licensing and coordinating administration. The Commission explained that it adopted this procedural framework in order to avoid issues of national comity and international coordination responsibilities for space stations. ***DISCO II Order.*** 12 FCC Rcd at 24174.1 188.

653 Two foreign-licensed LOI filers participated in the initial 2 GHz MSS processing round: ICO and TMI.

654 ***Flexibility Notice.*** 16 FCC Rcd at 15554, ¶ 51.

655 Id.

proposes that "an MSS entity that has already been granted an LOI to provide satellite services should be authorized to provide terrestrial services merely upon filing a letter request seeking an appropriate modification of its existing LOI."[656] According to TMI, this procedure will achieve the type of parity between U.S.- and foreign-licensed MSS operators that the WTO Basic Telecom Agreement requires. While TMI suggests that a "radio frequency plan should not be required with the modification request because the technical rules adopted for the MSS should be sufficient to address any interference problem,"[657] TMI concedes that some form of U.S. radio station license may be necessary to govern operation of the ancillary radio transmitters located on U.S. territory. TMI suggests that the Commission require foreign-licensed MSS operators granted access to serve the United States under an LOI to file an application to use terrestrial facilities in conjunction with their foreign-licensed MSS system.[658] According to TMI, this application "should be processed in the same manner as [an] application for blanket earth station licenses."[659]

245. We agree in part with TMI's proposal for licensing ATC facilities operators by foreign-licensed MSS providers. As with the U.S.-licensed MSS entities, we shall permit an MSS operator that has been granted an LOI to provide satellite services to the United States to file an application to modify its LOI authorization to use ATC in conjunction with its foreign-licensed MSS system, once operational. The application for ATC authority will be addressed either in conjunction with an application for Title III earth station authorization, or if such an authorization has already been granted, it may be filed as a minor modification to the earth station authorization under the same procedures described above for modification of U.S.-based MSS licensees' authorization. We believe that this approach achieves parity between U.S.- and foreign-licensed MSS operators.

3. MSS ATC Handset Earth Station Licensing

246. MSS operators providing service to the United States, including foreign-licensed MSS systems, are required to obtain blanket authorizations for mobile handset earth stations.[660] Blanket licensing allows a satellite operator to apply for authorization that permits the licensee to operate a specified number and type of qualified earth stations, rather than seeking an individual license for earth stations."[661] The technical characteristics of earth stations are reviewed in this process. In comparison, for terrestrial CMRS authorizations, handsets are reviewed pursuant to the certification rules contained in Part 2, Subpart J of our rules."[662] These rules require the applicant to submit a technical report on the equipment and to provide detailed information about the device, such as its manufacturer, operating

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656 TMI Comments at 4

657 *Id.*

658 *Id.* at 4-5; *accord* Constellation Comments at 30.

659 TMI Comments at 5.

660 See, *e.g.*, 41 C.F.R. § 25.115(d); ***TMI Communications and Company, LP. for Blanket Authorization to Operate up to 100,000 Mobile Satellite Earth Terminals (METs) though Canadian-licensed satellite MSAT-1 at 106.5 degrees W.L in frequency bands 1631.5-1660.5 MHz (transmit) and 1530-1559 MHz (receive) throughout the Continental United States, United States Territories, Alaska, and Hawaii.*** Order and Authorization. 15 FCC Rcd 18117 (Sat. Div., Int'l Bur. 2000); *Iridium U.S., L.P.*, Order and Authorization, 11 FCC Rcd 20474 (Int'l Bur. 1996).

661 *See. e.g., 18 GHz Order,* 15 FCC Rcd at 13471, ¶ 87.

662 47 C.F.R. § 2.1031 *erseq.*

mechanisms, and frequency usage.[663] In the *Flexibility Notice,* we sought comment on a requirement that handsets designed to operate using MSS ancillary terrestrial facilities be reviewed pursuant to our certification rules contained in Part 2, Subpart J of our rules.[664] In the *Flexibility Notice,* we stated that "[t]he use of equipment certification procedures for [MSS ATC] handsets would be consistent with procedures to authorize other handsets used for cellular-type service and would ensure that they satisfy any technical and safety requirements to protect co-channel and adjacent channel operations and end users."[665]

247. Most commenters that addressed the proper method of certifying MSS ATC end-user equipment support our proposal to review MSS ATC handsets under Part 2, Subpart J of our rules.[666] At least one MSS operator, however, suggested that the requirements may prove unnecessarily restrictive for MSS ATC. According to Constellation, the Commission need not adopt "an additional set of technical standards derived from conditions in the PCS bands when the current technical standards on MSS transceivers already address all potential interference cases in the MSS bands."[667] With a few exceptions, Constellation claims that "the only rule revisions ... necessary [are those that] ... clarify that the existing technical standards on MSS user transceivers apply to handsets whether transmitting to satellites or to terrestrial base stations."[668] WCA, however, questions Constellation's proposal to adopt only those rules that clarify that the same rules apply to handsets whether they are transmitting to the satellite or to the base station. Indeed, WCA opposes adopting our existing equipment-certification procedures on grounds that the existing requirements are too likely to lead to harmful interference to other operators in adjacent bands.[669] According to WCA, therefore, the Commission should require MSS ATC proponents to file detailed plans and technical analyses prior to authorizing MSS ATC to ensure that MSS ATC operations

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[663] See 47 C.F.R. § 2.1033

[664] *Flexibility Notice,* 16 FCC Rcd at 15555, ¶ 53 (citing 47 C.F.R. § 2.1031 *et seq.*)

[665] *Flexibility Nozice,* 16 FCC Rcd at 15555, ¶ 53.

[666] See, *e.g.*, ICO Comments at 48. MSV also supports requiring handsets to comply with Part 2, Subpart J of our rules, provided that MSS operators are not required to obtain a prior earth station authorization for every mobile services terminal. According to MSV, the Commission should adopt either an equipment-approval process, or a separate licensing process for MSS ATC terminals; MSS ATC providers should operate under either, but not both, of these regimes. MSV Comments at 30.

[661] Constellation Comments at 35. Constellation claims that, because MSS ATC handsets "will transmit to terrestrial repeaters at lower powers than when transmitting to satellites," these handsets "will cause no higher levels of interference than that permitted by handsets transmitting to MSS satellites." Constellation Comments at 13. "Since the current satellite mode standards adequately protect other services," Constellation claims that "there is no need to apply more stringent limits on handsets when operating with terrestrial repeaters." Constellation Comments at 13 n.21.

[668] Id. at 35-36. In a footnote, Constellation adds the caveat that "in the case where MSS downlink bands are used for ancillary terrestrial [Time Division Duplex] handset transmissions, the requirements of the corresponding MSS uplink band should be applied to these operations." Constellation Comments at 36 n.78. Constellation adds that in the Big LEO and 2 GHz MSS bands, the current Commission rules governing equipment certification procedures and safety and distress communications "should be applied to user transceivers when operating with terrestrial base stations, and has proposed minor amendments to the relevant rule sections to clarify this requirement with respect to user transceivers." Constellation Comments at 36.

[669] WCA "is dubious that if MSS spectrum is opened for terrestrial use, the minimal MSS handset rules can provide adequate protection against interference to nearby MDS and ITFS operations." WCA Reply at 6.

will not adversely affect services in adjacent bands, such as MDS and ITFS.[670]

248. Given our decision today that MSS licensees must provide an integrated offering of both the satellitedelivered service and the terrestrially delivered service to every customer,[671] we revise section 25.115(d) of our rules to clarify that, in addition to MSS operators requiring blanket authorization for METs operating with the satellite, MSS operators choosing to also operate ATC networks must also receive equipment certification pursuant to Part 2, Subpart J of our rules for all end user equipment. Therefore, if an MSS ATC provider or its distributors offer a single MET to the public that communicates with the satellite and the ATC network, the MET would require the blanket authorization and certification. If an MSS ATC provider or its distributors offer a MET that has separable parts, any part that communicates with the satellite would require traditional blanket authorization and certification, and the separable handset designed to operate using only MSS ancillary terrestrial facilities would require certification.[672] The use of certification procedures for these handsets is consistent with procedures to authorize other handsets used for cellular-type service and will ensure that they satisfy our technical and safety requirements to protect co-channel and adjacent channel operations and end users.

4. Construction Prior to MSS Operation

249. In the Flexibility Notice, we also sought comment on when authorized MSS licensees may begin construction of ATC facilities. Specifically, we asked whether we should permit construction of terrestrial facilities prior to obtaining an earth station license, at the MSS provider's own risk.[673] Many parties agree with our initial observation that "[p]ermitting advance construction and testing of terrestrial components would enable MSS operators to turn on their terrestrial service as soon as they have met their satellite coverage...requirement."[674] MSV, for example, "urges the Commission to allow construction and testing of terrestrial facilities at the MSS operator's own risk to ensure that integrated terrestrial operations commence at the earliest possible date."[675] Similarly, Constellation notes that construction of ATC base stations is a "time-consuming undertaking that requires substantial long lead time planning, site acquisition, design and manufacturing. installation, . . . testing" and similar activities.[676] Constellation also notes that delays in MSS ATC operations not only reduce the overall value of the MSS system and prevent the licensee from earning revenues and profits from the sale of its services to the public, but also prevent consumers from enjoying services that they might otherwise have acquired.[677] We agree.

250. While forcing licensees to delay construction would impose costs not only on licensees but also on consumers, authorizing early construction of authorized ATC facilities would result in little or no adverse effects either to consumers, producers or other Commission licensees. We believe that early demonstration of integrated systems will be beneficial to successful commercial introduction of services.

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670 *Id.* at 8-9; see *also* Inmarsat Comments at 9-16.

671 See supra § III(C) (commercial bundling discussion)

612 ICO Comments at 17.

673 *Flexibility Notice*, 16 FCC Rcd at 15551, ¶ 45; *id.* at 15555, ¶ 52

674 See Celsat Reply at 14; MSV comments at 30; ICO Comments at 46; Constellation Comments at 29.

675 MSV Comments at ii-iii.

676 Constellation Comments at 29.

677 See, *e.g.*, *id.* ("[s]ignificant delays in availability of a fully integrated system would delay customer ramp-up and have adverse financial impact on MSS operators").

Therefore, after an ATC authorization has been issued, at the MSS licensee's own risk and subject to the conditions specified in this Order, we will permit construction of ATC facilities after physical construction has begun on the MSS system's satellites, but prior to commencement of the provision of MSS services. For similar reasons, consistent with the rules and procedures adopted in this Order, we authorize MSS satellite operators to test ATC prior to commercial operation of their MSS systems. Specifically, during the process of constructing ATC facilities, the MSS operator, having obtained ATC authorization as described above may, without further authority from the Commission, conduct equipment tests for the purpose of making such adjustments and measurements as may be necessary to assure compliance with the terms of its ATC authorization, the technical provisions of the application, the rules and regulations and the applicable engineering standards.[678] We prohibit, however, commercial operation of ATCs before or until the MSS system is commercially operating as specified in this Order,[679] and such commercial operation of ATCs will result in enforcement action, including license revocation and/or the imposition of a monetary forfeiture.

H. Administrative Procedures

251. A few commenters question the decision-making sequence with respect to our decision to adopt this notice and our decisions in other related proceedings. Cingular and Verizon Wireless argue that the Commission cannot lawfully consider the issues raised in this docket until the Commission "fully and finally" resolves pending issues involving our licensing of 2 GHz MSS providers and denial of a petition for rulemaking seeking reallocation of 70 megahertz of 2 GHz MSS spectrum for terrestrial use.[680] According to these parties' joint comments, reasoned decision making does not permit the Commission to consider a change in the nature of the MSS band plan without first resolving whether the premises underlying the original allocation continue to be valid.[681]

252. Similarly, in an ex pane presentation, Iridium requests that the Commission defer acting on whether to allow MSS providers operating in the Big LEO band to provide ATC until the Commission "rectifies the spectrum inequity between Big LEO operators that has arisen due to the failure of several of the original licensees."[682] According to Iridium, competitive concerns and sound spectrum management dictate that the Commission decide on a new Big LEO band plan before adopting ATC, because Iridium would not be able to provide ATC over its portion of the Big LEO band, while Globalstar would be capable of providing ATC.[683] Iridium then sets forth proposals that would allocate to itself 11.5 megahertz of spectrum among the 1615.35-1626.5 MHz and 2495-2500 MHz bands.[684] In that regard.

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[678] *See* App. B. (47 C.F.R. § 25.143(j)).

[679] See supra § III(C)(4) (discussing commercial availability of MSS prior to initializing ATC).

[680] Cingular/Verizon Comments at 16.

[681] *Id.* at ii ("Reasoned decisionmaking does not allow a fundamental change in the nature of the MSS band plan without first resolving whether the premises underlying the original allocation still make any sense.")

[682] Letter from Richard E. Wiley, Counsel to Iridium Satellite LLC to Marlene H. Dortch, Secretary, Federal Communications Commission at I (Dec. 3,2002) (Iridium Deferral Letter).

[683] Iridium Deferral Letter at 6-9.

[684] *Id.* at 9-12: see also Letter from Jennifer D. Hindin, Counsel, Iridium Satellite LLC to Marlene M. Dortch. Secretary, Federal Communications Commission, IB Docket No. 01-185 at 2-5 (filed Dec. 11,2002) (Iridium Dec. II, 2002 *Ex Parte* Letter).

Iridium has also filed a petition for rulemaking asking that we revise our current rules to allow Iridium (a TDMA system) to operate in 5.85 megahertz of spectrum in the 1615.5-1621.35MHz portion of the Big LEO band, currently the upper segment of the CDMA service uplink band.[685] We seek comment on the proposal in the Iridium Petition, and other options related to the Big LEO band, *infra,* in the *Notice of Proposed Rulemaking.*

253. Below we find the claims of Cingular/Verizon and Iridium to be without merit. We have full discretion to resolve the issues in this rulemaking without first acting on the other matters that these parties discuss.

1. Further Delay Unwarranted in the 2 GHz MSS Bands

254. By way of background, on May 18, 2001, CTIA tiled a petition for rulemaking asking that all 70 megahertz of 2 GHz MSS spectrum be reallocated for terrestrial use and auctioned.[686] CTIA argued that the premise behind the Commission's 70 megahertz allocation to 2 GHz MSS systems, the creation of a satellite service that would cover rural areas, was no longer realistic in light of statements made by ICO and MSV in support of their request for spectrum flexibility.[687] In its petition, CTIA requested that the Commission defer licensing 2 GHz MSS systems until the Commission reaffirmed the viability of these systems.[688] On July 17, 2001, the International Bureau granted the MSS applications.[689] The Bureau also stated that the Commission would commence the instant proceeding to consider flexibility for MSS licensees.[690]

255. Cingular, Verizon Wireless and AT&T Wireless tiled a joint application for review of the license grants on August 16, 2001.[691] This application for review argued, among other things, that the International Bureau engaged in unreasoned decision making by granting the licenses before resolving questions concerning viability of MSS raised by the CTIA petition for rulemaking. In August 2001, the Commission denied in part the CTIA petition for rulemaking insofar as it requested reallocation of more than 14 megahertz of 2 GHz MSS spectrum.[692] On October 15, 2001, CTIA filed a petition for

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[685] *Amendment of Pans* 2.106, 25.143. *and* 25.202 *of the Commission's Rules to Require Operation of LEO MSS Systems Using TDMA/FDMA Techniques in the* 1615.5-1626.5*MHz Frequency Bands,* Petition for Rulemaking, Iridium Satellite LLC, at I (filed July 26,2002) *(Iridium Petition).*

[686] Petition for Rulemaking of the Cellular Telecommunications & Internet Association (filed May 18,2001)(CTIA Petition for Rulemaking). Several commenters. including CTIA, have made the same request in the instant proceeding. *See, e.g.*, CTIA Nov. 26 *Ex Pane* Letter at I; CTIA Nov. 20 Ex *Pane* Letter at 8; CTIA Nov. 19 *Ex Pane* Letter at *8;* Cingular/Sprint May 13. Ex *Pane* Letter at 15-16.

[687] CTIA Petition for Rulemaking at 2

[688] Id. at 3-4.

[689] *E.g., ICO* Services, 16 FCC Rcd at 13788-9, ¶¶ 30-31

[690] *Id.* at 13788, ¶ 30.

[691] Application for Review of AT&T Wireless Services, Inc., Cellco Partnership d/b/a Verizon Wireless, and Cingular Wireless LLC, DA 01-1631, (tiled Aug. 16, 2001) *(Licensing Application for Review).*

[692] *Advanced Services Further Notice.* 16 FCC Rcd at 16055, ¶ 23

reconsideration of the denial of its petition for rulemaking.[693] CTIA's reconsideration petition will be addressed by the Commission in a separate proceeding.[694]

256. Cingular and Verizon Wireless now claim that the Commission cannot properly consider whether to grant flexibility to 2 GHz MSS providers to integrate terrestrial components into their networks in their assigned spectrum until the Commission first resolves the application for review relating to the grant of the 2 GHz MSS licenses and CTIA's petition for reconsideration of the denial of its petition for rulemaking.[695] According to Cingular and Verizon Wireless, "to take up flexible use, before the validity of earlier actions has been resolved, is arbitrary and capricious decisionmaking."[696]

257. We conclude that Cingular and Verizon Wireless's unreasoned decision making arguments are without merit, and that we have full discretion to resolve the issues in this rulemaking without fust acting on the CTIA petition for reconsideration or the application for review. The courts have repeatedly held that the Commission and other administrative agencies have extensive latitude in managing their dockets, particularly when the agency explains why it chooses to act on some issues and defer others, as was the case in the Commission actions about which Cingular and Verizon Wireless complain.[697] As the D.C. Circuit held, an agency need not "make progress on every front before it can make progress on any front."[698] Simply put, we have broad discretion to manage the order in which we dispose of issues before us. We will address the merits of Cingular, Verizon Wireless and AT&T Wireless's joint application for review in a separate order.[699]

258. We also conclude that reasoned decision making does not require us to defer action in this proceeding pending resolution of the application for review or the CTIA petition for reconsideration. While captioning their proposals differently, Cingular and Verizon Wireless essentially argue for us to stay the instant proceeding pending resolution of their and CTIA's appeals. As we have previously held, such requests, no matter how captioned, are subject to the Commission's traditional test for such extraordinary relief?[700] Cingular and Verizon Wireless's comments do not satisfy the legal requirements

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693 *See Introduction of New Advanced Mobile and Fixed Terrestrial Services; Use of Frequencies Below 3 GHz, Petition for Rulemaking of the Cellular Telecommunications & Internet Association Concerning Reallocation of 2 GHz Spectrum for Terrestrial Wireless Use,* Petition for Reconsideration, ET Docket Nos. 00-258 and 95-18; IB Docket No. 99-81 at I (filed Oct. 15, 2001).

694 *See AWS Third Report and Order,* ET Docket No. 00-258, FCC 03-16

695 Cingular/Verizon Comments at ii

696 *Id*

697 *See, e.g., Western Union Int'l Inc. v. FCC,* 673 F.2d 539, 543-44 (D.C. Cir. 1982).

698 *Personal Watercraft Industry Ass'n v. Dept. of Commerce*, 48 F.3d 540,544 (D.C.Cir. 1993).

699 *See Boeing Company, Celsat America, Inc., Constellation Communications Holdings, Inc., Globalstar L.P., ICO Services Limited, Iridium L.LC., Mobile Communications Holdings. Inc, TMI Communications and Company. L.P.* Report and Order, IB Docket No. 99-81 (*2 GHz License Deferral and Application for Rulemaking*).

700 *See, e.g., Deferral of Licensing of MTA Commercial Broadband PCS.* PP Docket No. 93-253, ET Docket No. 92-100, Memorandum Opinion and Order, I I FCC Rcd 17052 (1996). We require a party seeking to stay a Commission proceeding to demonstrate that: (1j it has a substantial likelihood of succeeding on the merits; (2) it would suffer irreparable harm absent a stay; (3) grant of a stay would not harm others; and (4) the stay would be in the public interest. *Cumulus Licensing Corp. and Clear Channel Broadcasting Licensees. Inc.*, 16 FCC Rcd 1052. (continued....)

that would justify issuance of a stay. First, Cingular and Verizon Wireless have not presented any arguments or evidence that they are likely to succeed on the merits. Similarly, Cingular and Verizon Wireless have not demonstrated that they will be irreparably harmed in the absence of a stay.[701] Instead, Cingular and Verizon provide general arguments that competing demands for spectrum for advanced wireless services require that the Commission reallocate for 3G services more than the 10-14 MHz of 2 GHz MSS spectrum currently being considered for reallocation.[702] These arguments simply do not show that our failure to stay this proceeding will cause immediate, substantial harm to Cingular or Verizon Wireless. Rather Cingular and Verizon Wireless offer conjecture about events that may or may not occur in the future. Finally, a stay in this proceeding disserves the public interest by delaying the introduction of new competition and services contemplated by this order. Stay of this proceeding would also set a precedent that pending proceedings could be easily stayed by the filing of a petition for rulemaking, or a subsequent reconsideration process if such a petition is denied, even when the legal requirements for a stay have not been met. The Commission cannot permit its processes to be paralyzed by filings that make no attempt to meet the high burden of a stay. For these reasons we conclude that we need not resolve the application for review or CTIA's petition for reconsideration any more "fully and finally" than we have here and in the 2 GHz MSS licensing orders prior to granting flexibility to 2 GHz MSS operators.

2. Further Delay Unwarranted in the Big LEO Bands

259. We also decline Iridium's request to defer deciding whether to allow MSS providers operating in the Big LEO band to provide ATC until we address iridium's petition to adjust frequency assignments in the Big LEO band. As a practical matter, our decisions to permit Globalstar to implement MSS ATCs in the 1610-1615.5 MHz and 2492.5-2498.0 MHz bands, along with our requirement that base stations be tunable across the entire 2483.5-2500 MHz band, do not prejudice our consideration of potential revision to the Big LEO band plan regarding those frequencies Iridium has suggested for its use (11.5 megahertz of spectrum among the 1615.35-1626.5 MHz and 2495-2500 MHz bands). Moreover, we find that Iridium has not met the traditional test for us to defer resolution of this proceeding. Iridium has not demonstrated that it has a substantial likelihood of success on the merits. Rather, Iridium has demonstrated merely that conditions are sufficiently different from those present at the time the Commission adopted the Big LEO band plan to justify consideration, which we address in the *Notice* portion of this item. As noted above, our decision today in no way limits Iridium's ability to obtain the rights it seeks. Further, Iridium has failed to demonstrate that failure to stay this proceeding will cause immediate, substantial harm to Iridium. It is well established that financial losses are not sufficiently irreparable to meet the traditional test. Finally, we find that stay of this preceding would not serve the public interest of allowing all parties to move forward. In this case, we find that grant of a stay would have the anticompetitive and undesirable effect of preventing one Big LEO MSS licensee from achieving immediate expanded use of its assigned spectrum (with such use resulting in operational and other benefits), simply because it chose a technology that permits implementation of the services immediately, as compared to its competitor. Iridium would have us withhold services from the public because they can only be provided by a competitor, we find no basis for such a result. Therefore, we do not defer action on ATC in the Big LEO bands pending resolution of the issues raised in the Iridium Petition.

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1058, ¶ 20 (2001); *Washington Metropolitan Area Transit Comm. v. Holiday Tours, Inc.*, 559 F.2d 841, 842-43 (D.C. Cir. 1977).

[701] An injury qualifies as "irreparable harm" only if it is "both certain and great; it must be actual and not theoretical." Id. at 674. Therefore, to demonstrate irreparable harm, Cingular and Verizon must provide "proof indicating that the harm [it alleges] is certain to occur in the near future." *Id.*

[702] Cingular/Verizon Comments at 20-22

260. Finally, we deny Iridium's *ex parte* request for access to any part of the Big LEO service downlink band (2483.5-2500 MHz) at this time.[703] Based on Iridium's current authorization, it does not appear that its satellite system is designed or authorized to operate in the Big LEO service downlink band.[704] Though Iridium does not provide any technical information about the type of system or service that it would offer in the Big LEO service downlink band, it appears from Iridium's *ex parte* filings that it seeks authority to provide an ATC-only service in those bands. Since ATC, by definition, uses the same spectrum as, and is ancillary to, an operational licensed satellite service, the issue of whether Iridium could provide ATC in bands that it is not licensed for is not ripe for discussion in this Order. Iridium is free to comment and provide additional information on the type of service it seeks to offer in response to the *Notice of Proposed Rulemaking* initiated below.

IV. NOTICE OF PROPOSED RULEMAKING

261. In this section, we initiate IB Docket No. 02-364 to seek comment on proposals for reassigning or reallocating a portion of spectrum in the Big LEO MSS frequency bands. At the time that the Commission developed the Big LEO spectrum sharing plan, it explained that it might be appropriate to re-visit the plan in the future. Since then, two systems deployed and have begun to operate, while several other systems have either surrendered their license or failed to meet the terms of their license. These changes, as well as changing traffic patterns and consumer demands, suggest that it is now appropriate to re-examine the Big LEO spectrum plan. In addition, Iridium, one of the Big LEO operators, has requested access to additional spectrum in the Big LEO band.[705] As described below, we seek comment on the original spectrum-sharing plan. Iridium's proposal, and other possible uses of the spectrum.

A. Background

262. In 1994, the Commission adopted the Big LEO spectrum sharing plan.[706] At that time, there were five applicants for Big LEO licenses: Motorola Satellite Communications, Inc., pursuing the Iridium system, Loral/Qualcomm Partnership, L.P., pursuing the Globalstar system, TRW, Inc., pursuing the Odyssey system, Mobile Communications Holdings, Inc. (MCHI), pursuing the Ellipso system, and Constellation Communications, Inc. (Constellation), pursuing the Aries system. Iridium and Globalstar both launched and are operating global Big LEO MSS systems. In 1998, TRW surrendered the Odyssey system authorization.[707] The Commission has cancelled the licenses for Constellation's and MCHI's

[703] Iridium Deferral Letter at 10.

[704] ***Motorola Satellite Communications, Inc.***, Order and Authorization, 10 FCC Rcd 2268 (Int'l Bur. 1995). *erratum*, 10 FCC Rcd 3925, ***recon. denied.*** Memorandum Opinion and Order, 11 FCC Rcd 18502 (1996) ***(Iridium License)*** (authorizing Iridium to construct an MSS system capable of operating in the 1616-1626.5 MHz frequency band).

[705] Iridium Petition ***supra*** n.7

[706] ***Big LEO Order.*** 9 FCC Rcd at 5954-59, ¶¶ 43-53,

[707] See Public Notice. Report No. SPB-114, File Nos. 65-SAT-PLA-98; SAT-LOA-19971222-00230 at 3 (Jan. 15, 1998)(reporting letter from counsel for TRW, Inc. to Secretary of the Commission surrendering Big LEO authorization).

systems.[708]

263. Under the Big LEO spectrum sharing plan, the Commission found that up to four CDMA Big LEO MSS systems (Globalstar, Aries, Ellipso and Odyssey) could share 11.35 megahertz of service uplink spectrum in the 1610-1621.35 MHz band and 16.5 megahertz of service downlink spectrum in the 2483.5-2500 MHz band. The 16.5 megahertz service downlink spectrum in the 2483.5-2500 MHz band was reserved for assignment to CDMA systems. The Commission also found that one TDMA system (Iridium) could operate bidirectionally in 5.15 megahertz of spectrum in the 1621.35-1626.5MHz band. In the *Big* LEO Order, the Commission said that it would consider reducing the 11.35 megahertz of spectrum allocated for sharing among CDMA systems in the Big LEO service uplink band to 8.25 megahertz if only one CDMA system were implemented.[709] This adjustment would make 3.15 megahertz available for re-assignment. The Commission stated that it would decide in the context of a future rulemaking proceeding whether to re-assign the spectrum to the TDMA system or to make it available to a new entrant?"

264. Based on recent filings, Globalstar has stated that it is operating in nine of a total of 13 CDMA channels in the Big LEO service uplink spectrum.[711] Globalstar explains that each of the CDMA channels is 1.23 megahertz wide. A small amount of spectrum is used to provide frequency clearance between the channels and at the ends of the CDMA band for a total of approximately 11.35 megahertz in use by Globalstar.[712] Iridium currently uses the 5.15 megahertz of spectrum assigned to it in the 1621.35-1626.5 MHz band for both service up and down links?" Due to the fact that no other CDMA system has deployed, Globalstar has exclusive use of 16.5 megahertz of spectrum in the Big LEO CDMA service downlink band at 2483.5-2500 MHz.

B. Big LEO CDMA Spectrum Proposals

265. As the Commission said in the *Big* LEO Order, at some point in the future it might be appropriate to re-examine the Big LEO spectrum sharing plan in a rulemaking based on the circumstances at the time and make additional findings to refine the use of the band to better serve the public interest.[714]

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[708] *Constellation Communications Holdings. Inc.*, Memorandum Opinion and Order, 17 FCC Rcd 22584 (Int'l Bur. 2002). *petition for recon. pending; Mobile Communications Holdings, Inc.*, Memorandum Opinion and Order, 16 FCC Rcd 11766 (Int'l Bur. 2001), *petition for recon. denied,* Memorandum Opinion and Order, 17 FCC Rcd 11898 (Int'l Bur. 2002), *app. for review pending.*

[709] *Big LEO Order,* 9 FCC Rcd at 5959-60, ¶ 54

[710] *Id.* at 5959-60, ¶¶ 54-55

[711] Letter from Timothy J. Cooney, Counsel to Globalstar, to Magalie Roman Salas, Secretary, FCC, ET-Docket 98-142 (May 14, 2001), *available ar* <http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6512567466> (last visited, Jan. 9.2003).

[712] Based on the information provided in Globalstar's filing, Commission staff has roughly calculated that Globalstar's channelization plan is as follows: 1.23 megahertz service uplink channels each, small frequency clearance between the service channels of 0.01 megahertz and adjacent user frequency clearance of 0.195 megahertz on either end of the CDMA band.

[713] The International Bureau dismissed as moot Globalstar's request for Iridium's spectrum. as Iridium is still operational. *See* Letter from Jennifer Gilsenan, Chief, Satellite Policy Branch, to William Wallace, Counsel to Globalstar (Nov. 29,2001).

[714] *Big LEO Order,* 9 FCC Rcd at 5959-61, ¶¶ 54-57.

We have received a Petition for Rulemaking from the sole TDMA licensee, Iridium, seeking additional spectrum for use in the CDMA portion of the Big LEO band?" In addition, the Commission also left open the possibility of providing an opportunity for additional MSS entry in the Big LEO spectrum.[716] We believe that it is appropriate to seek comment on both the possible reassignment and possible reallocation of any returned spectrum for possible use by other services.

266. Iridium seeks reassignment of 5.85 megahertz of spectrum in the 1615.5-1621.35 MHz portion of the Big LEO band, which is currently the upper segment of the CDMA service uplink band.[717] Iridium states that it has growing demands for spectrum in the United States, has reached near-peak capacity use on its system at times in various regions of the world and that, based on projections and potential global events, it will need additional Big LEO spectrum in the near term.[718] Because only one CDMA Big LEO system has deployed, it is now appropriate to consider making at least 3.1 megahertz of additional spectrum available to Iridium. We will base our final judgment on the record established in this proceeding; however, we shorten the normal comment cycle for this Notice to expedite the decision-making process. Specifically, we will require comments on this *Notice* to be filed within 30 days of publication of this rulemaking in the Federal Register and reply comments to be filed within 15 days thereafter. We are taking this action to ensure that we will be in a position to act swiftly on Iridium's petition and resolve the Big LEO spectrum sharing plan issues. We acknowledge and encourage Iridium's proposal for the parties to develop cooperatively a mutually acceptable spectrum sharing plan, which could be presented to the Commission for consideration and public comment before the conclusion of the accelerated pleading cycle.[719] The presentation of a common proposal would facilitate prompt resolution of the issues; however, regardless of whether parties can reach agreement, we tentatively conclude that a rebalancing of the Big LEO band will serve the public interest and intend to proceed expeditiously on considering the appropriate amount of spectrum that each Big LEO MSS licensee should receive. We expect to complete action on this Notice prior to authorization of any ATC services in the Big LEO band.[720] In the event we are not able to do so, it may be necessary and in the public interest to specifically impose conditions on a grant of ATC authority that would preserve a full range of options concerning the Big LEO band plan and that would permit grant to Iridium of interim access to additional spectrum pending resolution of the further notice.

267. While Iridium provides anecdotal evidence of its potential need for additional spectrum,

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[715] Iridium Petition *supra* n.7.

[716] *Big LEO Order,* 9 FCC Rcd at 5960, ¶ 55.

[717] Iridium also seeks amendment of sections 2.106, 25.143, and 25.202 of the Commissions rules to facilitate its proposed change in the Big LEO assignments.

[718] *See* Letter from Richard E. Wiley. Counsel to Iridium Satellite. LLC, to Michael K. Powell, Chairman, FCC (Jan. 13,2003)(Iridium Jan. 13,2003 Ex *Pane* Letter).

[719] See Letter from Richard E. Wiley, Counsel to Iridium Satellite, LLC, to Marlene H. Dortch, Secretary, FCC (Dec. 18, 2002), *available at* <http://svartifoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6513398434 > (last visited, Jan. 9.2003) (Iridium Dec. 18,2002 *Ex Pane* Letter).

[720] As a practical matter, there will be a period of time before any MSS operator will be in a position to deploy ATC. As described in the Report portion of this document. MSS operators will be required to submit and obtain Commission approval of ATC based on information demonstrating compliance with our gating criteria, a request for modification to the space station license to include ATC and a request for certification of handsets before commencing ATC services.

downlink spectrum. Commenters should provide information on any other technical or regulatory aspects of ATC implementation that should be considered beyond the record already established in this proceeding.

C. Comment Dates

274. Pursuant to sections 1.415 and 1.419 of the Commission's Rules, 47 C.F.R. §§ 1.415, 1.419, interested parties may file comments on the Notice of Proposed Rulemaking in IB Docket No. 02-364 on or before 30 days after Federal Register publication and reply comments on or before 45 days after Federal Register publication. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS) or by filing paper copies.[727] All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

275. Comments filed through the ECFS can be sent as an electronic file via the Internet to http://www.fcc.gov/e-file/ecfs.html. Generally, only one copy of an electronic submission must be filed. In completing the transmittal screen, commenters should include their full names, Postal Service mailing addresses, and the applicable docket number, IB Docket No. 02-364. Parties may also submit an electronic comment by Internet e-mail. To get filing instructions for e-mail comments, commenters should send an e-mail to ecfs@fcc.gov, and should include the following words in the body of the message: "get form <your e-mail address>". A sample form and directions will be sent in reply.

276. Parties who choose to file by paper must file an original and four copies of each filing. If parties want each Commissioner to receive a personal copy of their filing, they must file an original plus nine copies. Paper filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail (although we continue to experience delays in receiving U.S. Postal Service mail). The Commission's contractor, Vistronix, Inc., will receive hand-delivered or messengerdelivered paper filings for the Commission's Secretary at 236 Massachusetts Avenue, N.E., Suite 110, Washington, D.C. 20002. The filing hours at this location are 800 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes must be disposed of before entering the building. Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capital Heights, MD 20743. U.S. Postal Service first-class mail, Express Mail, and Priority Mail should be addressed to 445 12th Street, S.W., Washington, D.C. 20054.

277. Comments and reply comments will be available for public inspection during regular business hours in the FCC Reference Center, 445 12th Street, S.W., Washington, D.C. Comments are also available on the ECFS, at http://gullfoss2.fcc.gov/cgi-bin/websql/prod//ecfs/comsrch_v2.hts.

V. PROCEDURAL MATTERS

278. ***Final Regulatory Flexibility Analysis.*** The Final Regulatory Flexibility Analysis for this Report and Order, pursuant to the Regulatory Flexibility Act, 5 U.S.C. § 604, is contained in Appendix D.

279. ***Final Paperwork Reduction Act Analysis.*** The requirements adopted in this Rulemaking have been analyzed with respect to the Paperwork Reduction Act of 1995 (the 1995 Act) and found to impose new or modified information collection requirements on the public. Implementation of any new or modified requirements will be subject to approval by the Office of Management and Budget (OMB) as

[727] See *Elecrroriic Filing of Documents in Rulemaking* Proceedings, Memorandum Opinion and Order on Reconsideration, 13 FCC Rcd 21517 (1998); Report and Order, 13 FCC Rcd 11322 (1998).

271. We also seek comment on the possibility of making any returned spectrum, including service downlink spectrum in the **2483.5-2500** MHz band, available in a second Big **LEO** processing round. We seek comment on whether there is a need for additional spectrum for new MSS systems in the Big LEO band and the level of interest in participating in a second Big LEO processing round. If we were to have a second round for Big **LEO** applicants, we seek comment on the type of criteria that we should **use** for entry. For instance, should applicants who have held Big **LEO** licenses in the past be eligible to participate in a second processing round? Should we continue our practice of not applying financial standards in cases where mutual exclusivity can be resolved? How much spectrum would need to be made available to provide sufficient incentive for applicants to participate in a second Big LEO processing round? Are the current Big LEO processing rules sufficient to handle a second processing round or would we need to conduct a rulemaking to develop appropriate rules for second round applicants and licensees? Should the Commission consider the possibility of permitting government use of the Big LEO spectrum to support a non-commercial Big LEO system? We seek comment on this alternative and any other relevant information that commenters believe may be helpful to the Commission.

272. Finally, we seek comment on the possibility of re-allocating any returned Big LEO spectrum. Under the plan adopted in this Order, spectrum in the **2483.5-2492.5 MHz** and **2498-2500** MHz bands could be available for other uses. For instance, we seek comment on allowing unlicensed devices to operate in any returned **spectrum.**[723] Currently, we restrict the operation of unlicensed devices in the **2483.5-2500** MHz band to avoid interference to **MSS.**[724] We also seek comment on allocating these bands for site-based or critical infrastructure **licensees.**[725] Alternatively, we seek comment on pairing spectrum in the **2483.5-2492.5 MHz** band with an equal amount of spectrum in the Big **LEO** service uplink band at **1610-1626.5 MHz.** For example, could we pair five megahertz in each band for a total of ten megahertz to create additional spectrum for assignment to a terrestrial CMRS licensee? Commenters should provide a technical rationale for how much spectrum would need to be made available to provide enough spectrum to support a viable service and provide support for the types of services that could make use of the spectrum. Commenters should also provide technical information addressing interference and other concerns that could be raised by the incumbent MSS licensees and other users of the spectrum, e.g., radioastronomy, and adjacent spectrum users.

273. We seek comment on all of these alternatives and any other relevant proposals that commenters may raise during the course of the comment cycle in this rulemaking. In light of our decision today in the Report and Order section of this document to adopt rules to permit implementation of MSS ATCs in the Big LEO bands, we will permit ATCs in those portions of the Big LEO bands without prejudice to the outcome of this Notice *of* Proposed *Rulemaking.*[726] We also seek comment on implementation of ATC in the portion of the Big LEO bands beyond those portions authorized for ATC today. Specifically, whether there are any advantages or disadvantages to allowing CDMA or TDMA systems to deploy ATC in particular parts of the unresolved portions of the Big LEO service up and

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[723] *47* C.F.R. § **15.247** (permitting frequency hopping and direct sequence spread spectrum intentional radiators, including for the **2400-2483.5** MHz band, meeting enumerated criteria).

[724] See *id.* § **15.205**

[125] See Critical Infrastructure Assurance Office, *About* ***CIAO, available at*** <http://www.ciao.gov/publicaffairs/about.html> (last visited. Jan. **6.2002)** (describing services)

[126] ***See supra*** § III(D) (clarifying that Iridium will be permitted to operate ATC in the **1621.35-1626.5** MHz band and Globalstar will be permitted to operate ATC in **1610-1615.5 MHz** and 2492.5-2498 MHz Big **LEO** MSS bands prior to completion of this rulemaking and subject to the ATC authorization procedures that we adopt today).

APPENDIX A LIST OF COMMENTING PARTIES

Comments (due October 22.2001):
Aerospace and Flight Test Radio Coordinating Counsel
American Petroleum Institute
Andrew R. Funk (late-filed)
Association for Maximum Service Television, Inc. and National Association of Broadcasters
AT&T Wireless Services, Inc.
Aviation Industry Parties
Boeing Company
Cellular Telecommunications and Internet Association
Celsat America, Inc.
Cingular Wireless and Verizon Wireless
Comtech Mobile Datacom Corp.
Constellation Communications Holdings, Inc.
David A. Montanaro
Globalstar, L.P. and L/Q Licensee, Inc.
Inmarsat Ventures PLC
Iridium Satellite LLC
KITComm Satellite Communications Ltd.
Loral Space and Communications Ltd.
Mobile Communications Holdings, Inc.
Mobile Satellite Users Association
Motient Services Inc., TMI Communications and Company, L.P., and Mobile Satellite New ICO Global Communications
Progress and Freedom Foundation
Rural Cellular Association
Skytower, Inc.
Society of Broadcast Engineers, Inc.
Stratos Mobile Networks (USA) LLC and Marinesat Communications Network, Inc.
Telenor Broadband Services AS
Telephone and Data Systems, Inc.
Telecommunications Industry Association—Wireless Communications Division
TMI Communications and Company, L.P.
Unofficial Bondholders Committee of Globalstar, L.P.
Ventures Subsidiary LLC
Wireless Communications Association International, Inc.

Reply Comments (due November 13, 2001):
2 GHz Broadcast Group
Association for Maximum Service Television, Inc. and National Association of Broadcasters
AT&T Wireless Services, Inc.
Boeing Company
Catholic Television Network
Cellular Telecommunications and Internet Association
Celsat America, Inc.
Cingular Wireless and Verizon Wireless
Comtech Mobile Datacom Corp.
Constellation Communications Holdings. Inc.
Globalstar, L.P. and L/Q Licensee, Inc.
Inmarsat Ventures PLC
Meredith Corporation
Motient Services Inc., TMI Communications and Company, L.P., and Mobile Satellite Ventures Subsidiary LLC
National ITFS Association
New ICO Global Communications
Rural Telecommunications Group
Society of Broadcast Engineers, Inc.
Stratos Mobile Networks (USA) LLC and Marinesat Communications Network, Inc.
Telephone and Data Systems, Inc.
TRW Inc.
Unofficial Bondholders Committee of Globalstar, L.P.
Voicestream Wireless Corp.
Walt Disney Company
Wireless Communications Association International, Inc.

Supplemental Comments (due March 22, 2002):
AT&T Wireless Services, Inc.
Boeing Company
Cellular Telecommunications and Internet Association
Celsat America, Inc.
Constellation Communications Holdings, Inc.
Globalstar, L.P.
ICO Global Communications

prescribed by the 1995 Act's emergency processing provisions. OMB approval is requested to be granted no later than 30 days from the date of publication of this Rulemaking in the Federal Register. The Commission, as part of its continuing effort to reduce paperwork burdens, invites the general public to comment on the information collections contained in this Report and Order, as required by the Act 1995. Public comments are due 21 days from date of publication of this Report and Order in the Federal Register. Comments should address: (a) whether the proposed collection of information is necessary for the proper performance of the functions of the Commission, including whether the information shall have practical utility; (b) the accuracy of the Commission's burden estimates; (c) ways to enhance the quality, utility, and clarity of the information collected; and (d) ways to minimize the burden of the collection of information on the respondents, including the use of automated collection techniques or other forms of information technology.

280. Written comments by the public on the new or modified information collection requirements are due 21 days after publication of this Rulemaking in the Federal Register. Comments on the information collections contained herein should be submitted to Judy Boley, Federal Communications Commission, 445 Twelfth Street, S.W., Room 1-C804, Washington. D.C. 20554, or over the Internet to jboley@fcc.gov and to Edward C. Springer, OMB Desk Officer, Room 10236 NEOB, 725 17th Street, N.W., Washington, D.C. 20503 or via the Internet to edward.springer@omb.eop.gov. For additional information on the information collection requirements, contact Judy Boley at (202) 418-0214 or via the Internet at the above address.

281. For further information concerning this proceeding, contact Breck Blalock at (202) 418-819l/bblalock@fcc.gov, or Trey Hanbury at (202) 418-0766/ghanbury@fcc.gov, International Bureau, Federal Communications Commission, Washington, DC 20554.

VI. ORDERING CLAUSES

282. IT IS ORDERED that, pursuant to sections 4(i), 7, 302, 303(c), 303(e), 303(f) and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. sections 154(i), 157, 302, 303(c), 303(e), 303(f) and 303(r), this Report and Order and Notice of Proposed Rulemaking IS ADOPTED and that Part 25 of the Commission's Rules IS AMENDED, as specified in Appendix B, effective 30 days after publication in the Federal Register.

283. IT IS FURTHER ORDERED that the Petition for Rulemaking filed by Iridium Satellite LLC IS GRANTED in part to the extent described above and IS DENIED in all other respects.

284. IT IS FURTHER ORDERED that the Regulatory Flexibility Analysis, as required by section 604 of the Regulatory Flexibility Act and as set forth in Appendix D, IS ADOPTED.

285. IT IS FURTHER ORDERED that the Commission's Consumer Information Bureau, Reference Information Center, SHALL SEND a copy of this Report and Order, including the Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNIATIONS COMMISSION

Marlene H. Dortch
Secretary

Appendix B: Final Rules

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR parts 2 and 25 as follows:

PART 2 -- FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

1. The authority citation for Part 2 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.

2. Section 2.106, the Table of Frequency Allocations, is amended to read as follows:

a. Revise pages 43, 44, 45, 46, 48, 49, and 52.

b. In the list of United States (US) Footnotes, add footnote US380.

§ 2.106 Table of Frequency Allocations

The revisions and additions read as follows:

* * * * *

Iridium Satellite LLC
Inmarsat Ventures PLC
Mobile Satellite Ventures Subsidiary LLC
Verizon Wireless

Ex Parte Commenters

Ashoka Innovators for the Public
AT&T Wireless Services, Inc.
AT&T Wireless Services, Inc., Cingular Wireless LLC, and Verizon Wireless
Bell South Corporation, Nucentrix Broadband Networks, Inc., Sprint Corporation, WorldCom, Inc., and Wireless Communications Association International, Inc.
Boeing Company
Catholic Television Network and the National ITFS Association
Cellular Telecommunications and Internet Association
Cellular Telecommunications and Internet Association and AT&T Wireless Services, Inc.
Celsat America, Inc.
Central Texas Communications, Inc., Leaco Rural Telephone Cooperative, Inc. and Adams Telecommunications
Cingular Wireless LLC
Constellation Communications Holdings, Inc., Mobile Communications Holdings. Inc. and ICO Global Communications Holdings Limited
Globalstar, L.P.
ICO Global Communications (Holdings) Ltd.
Informal Noteholders Committee of Globalstar, L.P.
Inmarsat Ventures PLC
Iridium Satellite LLC
International Telecommunications Union
Mobile Satellite Ventures Subsidiary LLC
Mobile Satellite Ventures Subsidiary LLC and U.S. GPS Industry Council
Mobile Communications Holdings
Nelson Mandela
Nextel Communications, Inc.
Official Committee of Unsecured Creditors of Globalstar. L.P.
Official Creditors Committee of Globalstar, L.P.
Qualcomm Inc.
Representative John Murtha
Representative John Thune, et al.
Satellite, L.L.C.
Senator Max Cleland
Senator John Edwards
Senator Ted Stevens
Senators Ernest Hollings, Ted Stevens, John D. Rockefeller IV, and Byron L. Dorgan
Sioux Valley Wireless, SkyCable TV of Madison, and W.A.T.C.H. TV
Society of Broadcast Engineers, Inc.
Sprint Corporation and Cingular Wireless LLC
Sprint Corporation, Worldcom, Inc., and Wireless Communications Association International, Inc.
TMI Communications and Company, L.P.
T-Mobile USA
Verizon Communications
TMI Communications and Company, L.P. and TerreStar Networks, Inc.
U.S. GPS Industry Council
Wireless Communications Association International
WorldNet Telecommunications, Inc.

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
1429-1452 FIXED MOBILE exceot aeronautical Mobile	1429-1452 FIXED MOBILE 5.343		1429.5-1432	See previous page	See previous page
				1430-1432 FIXED (telemetry) LAND MOBILE (telemetry) FIXED-SATELLITE (space-to-Earth) US368	P'rivate Land Mobile (90) Personal (95)
			5.341 US352	5.341 US350 US352	
			1432-1435	1432-1435 FIXED MOBILE except aeronautical mobile	Wireless Communications (27)
5.341 5.342	5.341		5.341 US361	5.341 US361	
1452-1492 FIXED MOBILE except aeronautical mobile BROADCASTING 5.345 5.347 BROADCASTING-SATELLITE 5.345 5.347 5.341 5.342	1452-1492 FIXED MOBILE 5.343 BROADCASTING 5.345 5.347 BROADCASTING-SATELLITE 5.345 5.347 5.341 5.344		1435-1525 MOBILE (aeronautical telemetry)		Avlation (87)
1492-1525 FIXED MOBILE exceot aeronautical mobile 5.341 5.342	1492-1525 FIXED MOBILE 5.343 MOBILE-SATELLITE (space-to-Earth) 5.348A 5.341 5.344 5.348	1492-1525 FIXED MOBILE 5.341 5.348A	5.341 US78		
1525-1530 SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) 5.351A Earth exploration-satellite Mobile except aeronautical mobile 5.349 5.341 5.342 5.350 5.351 5.352A 5.354	1525-1530 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.351A Earth exploration-satellite Fixed Mobile 5.343 5.341 5.351 5.354	1525-1530 SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earlh) 5.351A Earth exploration-salellite Mobile 5.349 5.341 5.351 5.352A 5.354	1525-1530 MBILE-SATELLITE (space-to-Earth) US380 Mobile (aeronautical telemetry) 5.341 5.351 US78		Satellite Communications (25) Aviation (87)

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
1610-1610.6 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION 5.341 5.355 5.359 5 363 5.364 5.366 5.367 5 368 5.369 5.371 5.372	1610-1610.6 MOBILE-SATELLITE (Earth-tospace) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to- space) 5.341 5.364 5.366 5.367 5.368 5.370 5.372	1610-1610.6 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Radiodelermination-satellite (Earth-to-space) 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.372	1610-1610.6 MOBILE-SATELLITE (Earth-lo-space) US319 US380 AERONAUTICAL RADIONAVIGATION US260 RADIODETERMINATION-SATELLITE (Earth-to-space) 5.341 5.364 5.366 5.367 5.368 5.372 US208		Satellite Communications (25) Aviation (87)
1610.6-1613.8 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION 5.149 5.341 5.355 5.359 5.363 5.364 5.366 5.367 5.368 5.369 5.371 5.372	1610.6-1613.8 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to- space) 5.149 5.341 5.364 5.366 5.367 5.368 5.370 5.372	1610.6-1613.8 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 5.149 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.372	1610.6-1613.8 MOBILE-SATELLITE (Earth-to-space) US319 US380 RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION US260 RADIODETERMINATION-SATELLITE (Earth-tospace) 5.149 5.341 5.364 5.366 5.367 5.368 5.372 US208		
1613.8-1626.5 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-lo-Earth) 5341 535553595363 5 364 5 3655 366 5.367 5 368 5.369 5 371 5 372	1613.8-1626.5 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to- space) Mobile-satellite (space-to- Earth) 5.341 5.364 5.365 5.366 5.367 5.368 5.370 5.372	1613.8-1626.5 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to- Earth) Radiodetermination- satellite (Earth-to-space) 5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.369 5.372	1613.8-1626.5 MOBILE-SATELLITE (Earth-to-space) US319 AERONAUTICAL RADIONAVIGATION US260 RADIODETERMINATION-SATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth) 5.341 5.364 5.365 5.366 5.367 5.368 5.372 US208 US380		

1530-1535 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE(space- to-Earth) 5.351A 5.353A Earth exploration-satellite Fixed Mobile except aeronautical mobile 5.341 5.342 5.351 5.354	1530-1535 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE(space-to-Earth) 5.351A 5.353A Earth exploration-satellite Fixed Mobile 5.343 5.341 5.351 5.354	1530-1535 MOBILE-SATELLITE (space-to-Earth) US380 MARITIME MOBILE-SATELLITE (space-to-Earth) Mobile (aeronauticaltelemetry) 5.341 5.351 US78 US315	
1535-1559 MOBILE-SATELLITE (space-to-Earth) 5.351A 5.341 5.351 5.353A 5.354 5.355 5.356 5.357 5.357A 5.359 5.362A		1535-1544 MOBILE-SATELLITE (space-lo-Earth) US380 MARITIME MOBILE-SATELLITE(space-to-Earth) 5.341 5.351 US315	Satellite Communications (25) Maritime (80)
		1544-1545 MOBILE-SATELLITE (space-to-Earth) 5.341 5.356	
		1545-1549.5 AERONAUTICAL MOBILE-SATELLITE (R) (space-to-Earth) Mobile-satellite (space-to-Earth) US380 5.341 5.351 US308 US309	Aviation (87)
		1549.5-1558.5 AERONAUTICAL MOBILE-SATELLITE (R) (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) US380 5.341 5.351 US308 US309	
		1558.5-1559 AERONAUTICAL MOBILE-SATELLITE(R) (space-to-Earth) 5.341 5.351 US308 US309 US380	
1559-1610 AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE(space-to-Earth)(space-to-space) 5.329A 5.341 5.362B 5.362C 5.363		1559-1610 AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) 5.341 US208 US260	Note: The NTIA Manual (footnote G126) slates that diflerential GPS stations may be authorized in the 1559- 1610 MHz band, but the FCC has not vet addressed this footnote.

			1755-1850 FIXED MOBILE G42	1755-1850	
5.149 5.341 5.385 5.386 5.387 5.388			1850-2025	1850-2000 FIXED MOBILE	RF Devices (15) Personal Communications (24) Fixed Microwave (101)
1930-1970 FIXED MOBILE 5.388A 5.388	11930-I970 FIXED MOBILE 5.388A Mobile-satellite (Earth-IC-space) 5.388	1930-1970 FIXED MOBILE 5.388A 5.388			
1970-1980 FIXED MOBILE 5.388A 5.388				NG177	
1980-2010 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.388 5.389A 5.389B 5.389F				2000-2020 MOBILE-SATELLITE (Earth-to-space) US380 NG156	!Satellite Communications (25)
2010-2025 FIXED MOBILE 5.388A 5.388	2010-2025 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.388 5.389C 5.389D 5.389E 5.390	2010-2025 FIXED MOBILE 5.388A 5.388		2020-2025 FIXED MOBILE NG177	
2025-2110 SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE(Earth-to-space)(space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (Earth-to-space) (space-IC-space) 5.392			2025-2110 SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space) SPACE RESEARCH (Ea to-space) (space-to-space) 5.391 5.392 US90 US222 US346 US347	2025-2110 FIXED NG23 NG118 MOBILE 5.391 5.392 US90 US222 US346 US347	TV Auxiliary Broadcasting (74F) Cable TV Relay (78) Local TV Transmission (101J)

1626.5-1660 MOBILE-SATELLITE (Earth-to-space) 5.351A	1626.5-1645.5 MOBILE-SATELLITE (Earth-lospace) US380 MARITIME MOBILE-SATELLITE (Earth-lo-space) 5.341 5.351 US315	Satellite Communications (25) Maritime (80)
	1645.5-1646.5 MOBILE-SATELLITE (Earth-lo-space) 5.341 5.375	
	1646.5-1651 AERONAUTICAL MOBILE-SATELLITE (R) (Earth-lo-space) Mobile-satellite (Earth-lo-space) US380 5.341 5.351 US308 US309	Aviation (87)
5.341 5.351 5.353A 5.354 5.355 5.357A 5.359 5.362A 5.374 5.375 5.376	1651-1660 LITE (Earth to-space) I AERONAUTICAL MOBILE-SATELLITE (R) (Earth-to-space) 5.341 5.351 US308 US309	
1660-1660.5 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY 5.149 5.341 5.351 5.354 5.362A 5.376A	1660-1660.5 AERONAUTICAL MOBILE-SATELLITE (R) (Earth-lo-space) RADIO ASTRONOMY 5.149 5.341 5.351 US308 US309 US380	
1660.5-1668.4 RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.341 5.379 5.379A	1660.5-1668.4 RADIO ASTRONOMY US74 SPACE RESEARCH (passive) 5.341 US246	
1668.4-1670 METEOROLOGICAL AIDS FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149 5.341	1668.4-1670 METEOROLOGICAL AIDS (radiosonde) RADIO ASTRONOMY US74 5.149 5.341 US99	

2483.5-2500 FIXED MOBILE MOBILE-SATELLITE (space-lo-Earth)5.351A Radiolocation 5.150 5.371 5.397 5.398 5.399 5.400 5.402	2483.5-2500 FIXED **MOBILE** **MOBILE-SATELLITE** **(space-to-Earth) 5.351A** **RA OCATION** **RA ETERMIN** SATELLITE (space-to-Earth) 5.398 5.150 5.402	2483.5-2500 FIXED **MOBILE** **MOBILE-SATELLITE** **a to-Earth) 5.351A** **DI OCATIC** **lic t inati** (space-to-Earth) 5.398 5.150 5.400 5.402	2483.5-2500 MOBILE-SATELLITE (space-to-Earth) US319 US380 RADIODETERMINATION- SATELLITE (space-to- Earth) 5.398 5.150 5.402 US41	21483.5-2500 MOBILE-SATELLITE ([space-io-Earth)US319 US380 RADIODETERMINATION- SATELLITE (space-to- lEarth) 5.398 5.150 5.402 US41 NG147	ISM Equipment (18) Satellite Communications (25) Private Land Mobile (90) Fixed Microwave (101)
2500-2520 FIXED 5.409 5.410 5.411 MOBILE excepi aeronautical mobile 5.384A MOBILE-SATELLITE(space- lo-Earth) 5.351A 5.403 5.405 5.407 5.412 5.414	2500-2520 FIXED 5.409 5.411 FIXED-SATELLITE(space-lo-Earth)5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE(space-to-Earth) 5.351A 5.403 5.404 5.407 5.414 5.415A		2500-2655	2500-2655 FIXED 5.409 5.411 US205 FIXED-SATELLITE (space-to-Earth) NG102 MOBILE except aeronautical mobile BROAD SATEL NG101	Domestic Public Fixed (21) Auxiliary Broadcasting (74)
2520-2655 FIXED 5.409 5.410 5.411 MOBILE except aeronautical mobile 5.384A BROADCASTING- SATELLITE 5.413 5.416 5.339 5.403 5.405 5.412 5.418 5.418B 5.418C	2520-2655 FIXED 5.409 5.411 FIXED-SATELLITE (space-to-Earth) 5.415 **MOBILE except aeronautica** **mobile 5.384A** **BROADCASTIN** SATELLITE 5.413 5.416 5.339 5.403 5.418B 5.418C	2520-2535 FIXED 5.409 5.411 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING- SATELLITE 5.413 5.416 5.403 5.415A 2535-2655 FIXED 5.409 5.411 MOBILE except aeronautical mobile 5.384A BROADCASTING- SATELLITE 5.413 5.416 5.339 5.418 5.418A 5.418B 5.418C	5.339 US205 US269	5.339 US269	

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
2110-2120 FIXED MOBILE 5.388A SPACE RESEARCH (deep space) (Earth-lo-space) 5.388			2110-2120 US252	2110-2155 FIXED NG23 MOBILE	Domestic Public Fixed (21) Public Mobile (22) Fixed Microwave (101)
2120-2160 FIXED MOBILE 5.388A 5.388	2120-2160 FIXED MOBILE 5.388A Mobile-satellite (space-to-Earth) 5.388	2120-2170 FIXED MOBILE 5.388A	2120-2200	US252 2155-2160 FIXED NG23	Domestic Public Fixed (21) Fixed Microwave (101)
2160-2170 FIXED MOBILE 5 388A 5.388 5.392A	2160-2170 FIXED MOBILE MOBILE-SATELLITE (space-lo-Earth) 5.388 5.389C 5.389D 5.389E 5.390	5.388		2160-2180 FIXED NG23 NG153 MOBILE NG178	Domestic Public Fixed (21) Public Mobile (22) Fixed Microwave (101)
2170-2200 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A 5.388 5.389A 5.389F 5.392A				2180-2200 MOBILE-SATELLITE (space-to-Earth) US380 NG23 NG168	Satellite Communications (25)
2200-2290 SPACE OPERATION (space-to-Earth) (space-tospace) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space)			2200-2290 SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED (line-of-sight only)	2200-2290	

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UNITED STATES (US) FOOTNOTES

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US380 In the bands **1525-1544 MHz, 1545-1559 MHz, 1610-1645.5 MHz, 1646.5-1660.5 MHz, 2000-2020 MHz, 2180-2200 MHz,** and **2483.5-2500 MHz,** a non-Federal Government licensee in the mobile-satellite service (MSS) **may** also operate an ancillary terrestrial component in conjunction with its MSS network, subject to the Commission's rules for ancillary terrestrial components and subject to all applicable conditions and provisions of its MSS authorization.

* * * * *

PART 25--SATELLITE COMMUNICATIONS

3. The authority citation for Part 25 continues to read as follows:

AUTHORITY: 47 U.S.C. 701-744. Interprets or applies sec. 303.47 U.S.C. 303. 47 U.S.C. sections 154, 301, 302,303, 307, 309 and 332, unless otherwise noted.

4. Section 25.117 is amended to read as follows:

§ 25.117 Modification of station license.

* * * * *

(f) An application for modification of a space station license to add an ancillary terresmal component to an eligible satellite network will be treated as a request for a minor modification if the particulars of operations provided by the applicant comply with the criteria specified in § 25.147.

* * * * *

5. Section 25.143 is amended to read as follows:

§ 25.143 Licensing provisions for the 1.6/2.4 GHz mobile-satellite service and the 2 GHz mobile-satellite service.

* * * * *

(i) Incorporation of ancillary terrestrial component base stations into a 1.6/2.4 GHz mobile-satellite service network or a 2 GHz mobile-satellite service network. Any licensee authorized to construct and launch a 1.6/2.4 GHz or a 2 GHz mobile-satellite system may construct ancillary terrestrial component (ATC) base stations as defined in § 25.201 of this pan at its own risk and subject to the conditions specified in this subpart any time after commencing construction of the mobile-satellite service system.

(j) Pre-Operational Testing. An MSS ATC licensee may, without further authority from the Commission, conduct equipment tests for the purpose of making such adjustments and measurements as may be necessary to assure compliance with the terms of the technical provisions of its MSS license, its ATC authorization, the rules and regulations in this Part and the applicable engineering standards. An MSS licensee may not offer ATC service to the public for compensation during pre-operational testing. In order to operate any ATC base stations, such a licensee must meet all the requirements set forth in § 25.147 and must have been granted ATC authority through a modification of its space station license.

(k) Aircraft. ATC mobile terminals must be operated in accordance with 25.136(a). All portable or hand-held transceiver units (including transceiver units installed in other devices that are themselves portable or hand-held) having operating capabilities in the 2000-2020/2180-2200 MHz or 1610-1626.5 MHz/2483.5-2500 MHz bands shall bear the following statement in a conspicuous location on the device: "This device may not be operated while on board aircraft. It must be turned off at all times while on board aircraft."

* * * * *

6. Section 25.146 is amended to read as follows:

§ 25.146 Licensing provisions for the L-Band mobile-satellite service.

* * * * *

the guidelines for human exposure to radio frequency electromagnetic fields as defined in §§ 1.1307(b) and 1.1310 of the Commission's rules for PCS networks.

(6) ATC base station operations shall use less than all available MSS frequencies when using all available frequencies for ATC base station operations would exclude otherwise available signals from MSS space-stations.

(b) Applicants for an ancillary terrestrial component shall demonstrate compliance with the following criteria through certification:

(1) Geographic and Temporal Coverage.

(i) For the 2 GHz MSS band, an applicant must demonstrate that it can provide space-segment service covering all 50 states, Puerto Rico, and the U.S. Virgin Islands one-hundred percent of the time, consistent with the coverage requirements for 2 GHz MSS GSO operators.

(ii) For the L-band, an applicant must demonstrate that it can provide space-segment service covering all 50 states, Puerto Rico, and the U.S. Virgin Islands one-hundred percent of the time, unless it is not technically possible for the MSS operator to meet the coverage criteria from its orbital position.

(iii) For the Big LEO band, an applicant must demonstrate that it can provide space-segment service (i) to all locations as far north as 70° North latitude and as far south as 55° South latitude for at least seventy-five percent of every 24-hour period, i.e., that at least one satellite will be visible above the horizon at an elevation angle of at least 5° for at least 18 hours each day, and (ii) on a continuous basis throughout the fifty states, Puerto Rico and the U.S. Virgin Islands, i.e., that at least one satellite will be visible above the horizon at an elevation angle of at least 5° at all times.

(2) Replacement Satellites.

(i) Operational NGSO MSS ATC systems shall maintain an in-orbit spare satellite.

(ii) Operational GSO MSS ATC systems shall maintain a spare satellite on the ground within one year of commencing operations and launch it into orbit during the next commercially reasonable launch window following a satellite failure.

(iii) All MSS ATC licensees must report any satellite failures, malfunctions or outages that may require satellite replacement within ten days of their occurrence.

(3) Commercial availability. Mobile-satellite service must be commercially available (viz., offering services for a fee) in accordance with the coverage requirements that pertain to each band as a prerequisite to an MSS licensee's offering ATC service.

(4) Integrated Services. MSS licensees shall offer an integrated service of MSS and MSS ATC. Applicants for MSS ATC may establish an integrated service offering by affirmatively demonstrating that:

(i) The MSS ATC operator will use a dual-mode handset that can communicate with both the MSS network and the MSS ATC component to provide the proposed ATC service; or,

(ii) Other evidence establishing that the MSS ATC operator will provide an integrated service offering to the public.

(5) In-band Operation.

(i) In the 2 GHz MSS band, MSS ATC is limited to an MSS's licensee's selected assignment. MSS ATC operations beyond the MSS licensee's selected assignment are prohibited.

(ii) In the Big LEO band, MSS ATC is limited to no more than 5.5 MHz of spectrum in each direction of operation. Licensees in these bands may implement ATC only on those channels on which MSS is authorized, consistent with the Big LEO band-sharing arrangement.

(iii) In the L-band, MSS ATC is limited to those frequency assignments available for MSS use in accordance with the Mexico City Memorandum of Understanding, its successor agreements or the result of other organized efforts of international coordination.

(c) Equipment certification.

(g) Incorporation of ancillary terrestrial component base station into an L-band Mobile-Satellite Service System. Any licensee authorized to construct and launch an L-band mobile-satellite system may construct ancillary terrestrial component (ATC) base stations as defined in § 25.201 of this part at its own risk and subject to the conditions specified in this subpart any time after commencing construction of the mobile-satellite service system.

(h) Pre-Operational Testing. An MSS ATC licensee may, without further authority from the Commission, conduct equipment tests for the purpose of making such adjustments and measurements as may be necessary to assure compliance with the terms of the technical provisions of its MSS license, its ATC authorization, the rules and regulations in this Part and the applicable engineering standards. An MSS licensee may not offer ATC service to the public for compensation during pre-operational testing. In order to operate any ATC base stations, such a licensee must meet all the requirements set forth in § 25.147 and must have been granted ATC authority through a modification of its space station license.

(i) Aircraft. All portable or hand-held transceiver units (including transceiver units installed in other devices that are themselves portable or hand-held) having operating capabilities in the 1626.5-1660.5 MHz and 1525-1559 MHz bands shall bear the following statement in a conspicuous location on the device: "This device may not be operated while on board aircraft. It must be turned off at all times while on board aircraft."

* * * * *

7. New Section 25.147 is added to read as follows:

§ 25.147 Application requirements for ancillary terrestrial comwnents in the mobile-satellite service networksoperating in the 1.5/1.6 GHz, 1.6/2.4 GHz and 2 GHz mobile-satellite service.

(a) Applicants for ancillary terrestrial component authority shall demonstrate compliance with the following through certification or explanatory technical exhibit, as appropriate:

(1) ATC shall be deployed in the forward-band mode of operation whereby the ATC mobile terminals transmit in the MSS uplink bands and the ATC base stations transmit in the MSS downlink bands in portions of the 2000-2020 MHz/2180-2200 MHz bands (2 GHz band), the 1626.5-1660.5 MHz/1525-1559 MHz bands (L-band), and the 1610-1626.5MW2483.5-2500 MHz bands (Big LEO band).

(2) ATC operations shall be limited to certain frequencies:

(i) In the 2000-2020 MHz/2180-2200 MHz bands (2 GHz MSS band), ATC operations are limited to the selected assignment of the 2 GHz MSS licensee that seeks ATC authority.

(ii) In the 1626.5-1660.5 MHz/1525-1559 MHz bands (L-band), ATC operations are limited to the frequency assignments authorized and internationally coordinated for the MSS system of the MSS licensee that seeks ATC authority.

(iii) In the 1610-1626.5MHz/2483.5-2500 MHz bands (Big LEO band), ATC operations are limited to the 1610-1615.5 MHz, 1621.35-1626.5 MHz, and 2492.5-2498.0 MHz bands and to the specific frequencies authorized for use by the MSS licensee that seeks ATC authority.

(3) ATC operations shall not exceed the geographical coverage area of the mobile-satellite service network of the applicant for ATC authority.

(4) ATC base stations shall comply with all applicable antenna and structural clearance requirements established in Part 17 of the Commission's rules.

(5) ATC base stations and mobile terminals shall comply with Part 1 of the Commission's rules, Subpart I – Procedures Implementing the National Environmental Policy Act of 1969. including

Structural attenuation. The term "structural attenuation" means the signal attenuation caused by transmitting to and from mobile terminals which are located in buildings or other man-made structures that attenuate the transmission of radiofrequency radiation.

* * * * *

9. New Section **25.252** is added to read as follows:

§ 25.252 Special requirements for ancillary terrestrial components operating in the 2000-2020 MHz/2180-2200 MHz bands

Angle from Direction of Maximum Gain. in Vertical Plane, Above Antenna (Degrees)	Antenna Discrimination Pattern (dB)
0 to 15	Meet or exceed ITU-R Rec. **F.1336,** Annex **1,** for P-MP Antennas
15 to **180**	Not to Exceed Gmax **- 25**

Angle from Direction of Maximum Gain, in Vertical Plane, Above Antenna (Degrees)	Antenna Discrimination Pattern (dB)
0	Gmax
2.....	Not to Exceed Gmax - 14
8 to **180**	Not to Exceed Gmax **- 25**

(1) Each ATC MET utilized for operation under this part and each transmitter marketed, as set forth in Sec. 2.803 of this chapter, must be of a type that has been authorized by the Commission under its certification procedure for use under this part.

(2) Any manufacturer of radio transmitting equipment to be used in these services may request equipment authorization following the procedures set forth in subpart J of part 2 of this chapter. Equipment authorization for an individual transmitter may be requested by an applicant for a station authorization by following the procedures set forth in part 2 of this chapter.

(3) Licensees and manufacturers are subject to the radiofrequency radiation exposure requirements specified in 1.1307(b), 2.1091 and 2.1093 of this chapter, as appropriate. MSS ATC base stations must comply with the requirements specified in 1.1307(b) for PCS base stations. MSS ATC mobile terminals must comply with the requirements specified for mobile and portable PCS transmitting devices in 1.1307(b). MSS ATC mobile terminals must also comply with the requirements in 2.1091 and 2.1093 for Satellite Communications Services devices. Applications for equipment authorization of mobile or portable devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

(d) Applicants for an ancillary terrestrial component authority shall demonstrate compliance with the provisions of §§ 1.924 and 25.203(e)-(g) and with §§ 25.252, 25.253, or 25.254, as appropriate, through certification or explanatory technical exhibit.

(e) Upon receipt of ATC authority, all ATC licensees must ensure continued compliance with this section and §§ 25.252, 25.253, or 25.254, as appropriate.

8. Section 25.201 is amended by amending and adding the following definitions in alphabetical order to read as follows:

§ 25.201 Definitions.

* * * * *

Ancillary terrestrial comuonent. The term "ancillary terrestrial component" means a terrestrial communications network used in conjunction with a qualifying satellite network system authorized pursuant to these rules and the conditions established in the Report and Order issued in IB Docket 01-185, Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band. the L-Band, and the 1.6/2.4 GHz Band.

Ancillary terrestrial comuonent base station. The term "ancillary terrestrial component base station" means a terrestrial fixed facility used to transmit communications to or receive communications from one or more ancillary terrestrial component mobile terminals.

Ancillary terrestrial comuonent mobile terminal. The term "ancillary terrestrial component mobile terminal" means a terrestrial mobile facility used to transmit communications to or receive communications from an ancillary terrestrial component base station or a space station.

Selected assignment. The term "selected assignment" means a spectrum assignment voluntarily identified by a 2 GHz MSS licensee at the time that the licensee's first 2 GHz mobile-satellite service satellite reaches its intended orbit, or other mobile-satellite service spectrum in which the Commission permits a 2 GHz mobile-satellite service licensee to conduct mobile-satellite service operations with authority superior to that of other in-band, mobile-satellite service licensees.

Greater than -1.4 dBW	20%
Greater than -0.4 dBW	18.2%

(3) implement the provisions of subsection (2) in a manner that precludes other ATC mobile terminals from using the open time slots.

(4) demonstrate, at the time of application, how the ATC network will comply with the requirements of subsections (a) and (b)(1) through (b)(3) above.

(5) demonstrate, at the time of application, how its ATC network will comply with the requirements of footnotes US308 and US315 to the table of frequency allocations contained in § 2.106 of the Commission's rule regarding priority and preemptive access to the L-band MSS spectrum by the aeronautical mobile-satellite en-route service (AMS(R)S) and the global maritime distress and safety system (GMDSS).

(6) demonstrate how its ATC network base stations and mobile terminals will comply with the Global Mobile Personal Communications by Satellite (GMPCS) system requirements to protect the radionavigation satellite services (RNSS) operations in the allocation above **1559 MHz.**

(7) coordinate with the terrestrial CMRS operators prior to initiating ATC transmissions when co-locating ATC base stations with terrestrial commercial mobile radio service (CMRS) base stations that make use of Global Positioning System (GPS) time-based receivers.

(8) demonstrate that the cellular structure of the ATC network design includes 18 dB of link margin allocated to structural attenuation. If less structural attenuation is used, the maximum number of base stations permitted under paragraph (c) of this section must be reduced or a showing must be made that there would be no increase in interference to other MSS operators and that the applicant's satellite would continue to meet the other requirements of this section.

(b) ATC base stations shall not exceed an out-of-channel emissions measurement of **-57.9** dBW/MHz at the edge of a MSS licensee's authorized and internationally coordinated MSS frequency assignment.

(c) The maximum number of base stations operating in the **U.S.** on any one 200 kHz channel shall not exceed 1725. During the first 18 months following activation for testing of the first ATC base station, the L-band ATC operator shall not implement more than 863 base stations on the same 200 kHz channel. L-band ATC operators shall notify the Commission of the date of the activation for testing of the first ATC base station and shall maintain a record of the total number of ATC base stations operating in the U.S. on any given 200 kHz of spectrum. Upon request by the Commission, L-band ATC operators shall provide this information to resolve any claim it receives from an L-band MSS operator that ATC operations are causing interference to its MSS system.

(d) Applicants for an ancillary terrestrial component in these bands must demonstrate that ATC base stations shall not:

(1) exceed peak **EIRP** of **19.1** dBW, in 200 kHz, per carrier with no more than three carriers per sector;

(2) exceed an EIRP toward the physical horizon (not to include man-made structures) of 14.1 dBW per carrier in 200 kHz;

(3) locate any ATC base station less than 470 meters from all airport runways and aircraft stand areas, including takeoff and landing paths;

(4) exceed an aggregate power flux density level of -73.0 dBW/m^2/200 kHz at the edge all airport runways and aircraft stand areas, including takeoff and landing paths;

(5) locate any ATC base station less than 1.5 km from the boundaries of all navigable waterways or the ATC base stations shall not exceed a power flux density level of -64.6 dBW/m^2/200 kHz at the water's edge of any navigable waterway;

(6) exceed a peak gain of **16** dBi;

(7) exceed an EIRP in the 1559-1605 MHz band of -70 dBW/MHz for wideband emissions and -80 dBW for narrow-band emissions. After January I, 2005, the ATC station shall not exceed an EIRP in the 1605-1610 MHz frequency range that is determined by linear interpolation from –70 dBW/MHz at 1605 MHz to –10 dBW/MHz at 1610 MHz for wideband emissions. The wideband

(b) Applicants for an ancillary terrestrial component in these bands must demonstrate that ATC mobile terminals shall:

(1) observe a peak EIRP limit of 1.0 dBW in 1.23 MHz.

(2) limit out-of-channel emissions at the edge of a MSS licensee's selected assignment to -67 dBW/4 kHz.

(3) not exceed an E R P in the 1559-1605 MHz band of -70 dBW/MHz for wideband emissions and -80 dBW for narrow-band emissions. The wideband EIRP level is to be measured using a root mean square (RMS) detector function with a minimum resolution bandwidth of 1 MHz and the video bandwidth is not less than the resolution bandwidth. The narrowband E R P level is to be measured using an R M S detector function with a resolution bandwidth of no less than I kHz. The measurements are to be made over a 20 millisecond averaging period when the base station is transmitting data.

(c) For ATC operations in the 2000-2020 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On any frequency within the 2000 to 2020 MHz band outside the licensee's frequency band(s) of operations, emissions shall be attenuated by at least 43 + 10 log (P) dB.

(2) Emissions on frequencies lower than 1995 MHz and higher than 2025 MHz shall be attenuated by at least 70 + 10 log P. Emissions in the bands 1995-2000 MHz and 2020-2025 MHz shall be attenuated by at least a value as determined by linear interpolation from 70 + 10 log P at 1995 MHz or 2025 MHz, to 43 + 10 log P dB at the nearest MSS band edge at 2000 MHz or 2020 MHz respectively.

(3) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, in its discretion, require greater attenuation than specified in paragraphs (1) and (2) above.

(4) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater.

Note: The preceding rules of § 25.252 are based on cdma2000 system architecture. To the extent that a 2 GHz MSS licensee is able to demonstrate that the use of a different system architecture would produce no greater potential interference than that produced as a result of implementing the rules of this section, an MSS licensee is permitted to apply for ATC authorization based on another system architecture.

10. New Section 25.253 is added to read as follows:

§ 25.253 Special req ir e for ancillary terrestrial components operating in the 1626.5-1660.5 MHz/1525-1559 MHz bands.

(a) An applicant for an ancillary terrestrial component in these bands shall:

(1) implement the maximum available power control for all ATC base stations and mobile terminals under GSM 800 or GSM 1800 standard (dynamic range of 30 dB in steps of 2 dB).

(2) implement a variable rate vocoder in the ATC mobile terminal such that the duty cycle of the mobile terminal is reduced when the EIRP of the mobile terminals requested by the power control system is increased above a nominal -7.4 dBW. The duty cycle will be reduced by refraining from transmitting on consecutive time slots. The duty cycle of the mobile terminal, as measured over a 0.25 second period, shall comply with the following schedule:

Nominal Mobile Terminal Peak EIRP	Mobile Terminal Transmit Duty Cycle
Equal to or less than -7.4 dBW	100%
Greater than -7.4 dBW	50%
Greater than -4.4 dBW	25%

Note: The preceding rules of § 25.253 are based on GSM/TDMA 800 or GSM 1800 system architecture. To the extent that an L-band MSS licensee is able to demonstrate that the use of a different system architecture would produce no greater potential interference than that produced as a result of implementing the rules of this section, an MSS licensee is permitted to apply for ATC authorization based on another system architecture.

11. New Section 25.254 is added to read as follows:

§ 25.254 cial requirements for ancillary terrestrial components operating in the 1610-1626.5 2500 MHz bands

(a) An applicant for an ancillary terrestrial component in these bands must demonstrate that ATC base stations shall:

(1) not exceed a peak EJRF' of 32 dBW in 1.25 MHz;

(2) not cause unacceptable interference to systems identified section 25.254(c) and, in any case, shall not exceed out-of-channel emission of -44.1 dBW/30 kHz at the edge of the MSS licensee's authorized frequency assignment;

(3) at the time of application, that it has taken, or will take steps necessary to avoid causing interference to other services sharing the use of the 2450-2500 MHz band through frequency coordination; and

(4) not exceed an EIRP in the 1559-1605 MHz band of -70 dBW/MHz for wideband emissions and -80 dBW for narrow-band emissions. After January 1, 2005, the ATC station shall not exceed an EIRP in the 1605-1610 MHz frequency range that is determined by linear interpolation from –70 dBW/MHz at 1605 MHz to –10 dBW/MHz at 1610 MHz for wideband emissions. The wideband EIRP level is to be measured using a root mean square (RMS) detector function with a minimum resolution bandwidth of 1 MHz and the video bandwidth is not less than the resolution bandwidth. The narrowband EJRF' level is to be measured using an RMS detector function with a resolution bandwidth of no less than 1 kHz. The measurements are to be made over a 20 millisecond averaging period when the base station is transmitting data.

(b) An applicant for an ancillary terrestrial component in these bands must demonstrate that mobile terminals shall:

(1) meet the requirements contained in § 25.213 to protect radio astronomy service (RAS) observations in the 1610.6-1613.8 MHz band from unacceptable interference;

(2) observe a peak EIRP limit of 1.0 dBW in 1.25 MHz;

(3) observe an out-of-channel EIRP limit of -57.1 dBW/30 kHz at the edge of the licensed MSS frequency assignment.

(4) not exceed an EIRP in the 1559-1605 MHz band of -70 dBW/MHz for wideband emissions and -80 dBW for narrow-band emissions. The wideband EIRP level is to be measured using a root mean square (RMS) detector function with a minimum resolution bandwidth of 1 MHz and the video bandwidth is not less than the resolution bandwidth. The narrowband EIRP level is to be measured using an RMS detector function with a resolution bandwidth of no less than 1 kHz. The measurements are to be made over a 20 millisecond averaging period when the base station is transmitting data.

(c) Applicants for an ancillary terrestrial component to be used in conjunction with a mobile-satellite service system using CDMA technology shall coordinate the use of the Big LEO MSS spectrum designated for CDMA systems using the framework established by the ITU in Recommendation ITU-R M.1186.

Note: The preceding rules of § 25.254 are based on cdma2000 and IS-95 system architecture. To the extent that a Big LEO MSS licensee is able to demonstrate that the use of different system architectures would produce no greater potential interference than that produced as a result of implementing the rules

Angle from Direction of Maximum Gain, in Vertical Plane, Above Antenna (Degrees)	Antenna Discrimination Pattern (dB)
0	Gmax
5	Not to Exceed Gmax – 5
10	Not to Exceed Gmax -19
15 to 30	Not to Exceed Gmax – 27
30 to 55	Not to Exceed Gmax – 35
55 to 145	Not to Exceed Gmax – 40
145 to 180	Not to Exceed Gmax – 26

APPENDIX C1: TECHNICAL EVALUATION OF 2 GHz MSS ATC PROPOSALS

1.0 Assessment of Assumptions Used in Technical Analysis

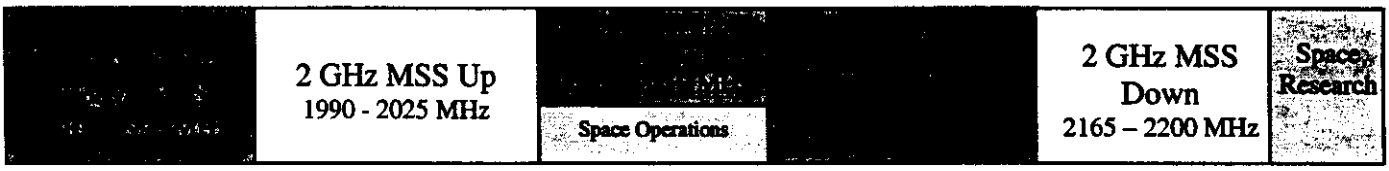
ICO, a 2 GHz mobile satellite service (MSS) licensee, submitted a proposal for an Ancillary Terrestrial Component (ATC) system to operate in conjunction with its MSS System. In its ATC proposal. ICO does not specifically define which bands it would use for the base stations (BS) and user mobile terminal (MT) transmitters. Instead, ICO lists four possible modes of implementing the ATC system. As shown in the following Table, the consideration of the four possible ATC modes requires that proposed MT and BS transmitter operations be analyzed for compatibility in both the MSS uplink (1990-2025 MHz) and MSS downlink (2165-2200 MHz) frequency bands.

Implementation Scheme	MSS Uplink Band	MSS Downlink Band
Uplink Hybrid	BS and MT	
Downlink Hybrid		BS and MT
Forward Band	MT	BS
Reverse Band	BS	MT

In addition to the MSS uplink and downlink bands, the ICO ATC proposal potentially affects the operations of systems in adjacent frequency bands shown in the Figure 1 below. In general there are two different situations: adjacent assignment and adjacent allocation. This appendix analyzes the potential interference to MSS systems operating within the MSS frequency allocation on MSS assignments adjacent to ICO's MSS selected assignment and to other types of communication systems operating in allocations adjacent to the MSS allocations.

The adjacent allocation situation occurs at the allocation boundary between the MSS and the services that operate in the adjacent bands. The adjacent assignment situation occurs between ICO and the MSS systems that will occupy adjacent MSS assignments within the MSS Allocation. Co-frequency sharing between an MSS system and the terrestrial fixed systems which currently occupy the 2 GHz MSS allocations has been addressed in the 2 GHz Service Rules Report and Order and is not a topic of this Technical Appendix.[1]

Figure 1 - 2 GHz MSS and Adjacent Allocated Bands



1.1 Out-of-Band Emission Levels

ICO states that the ATC transmitters will either operate in the ICO MSS assignment or, on a secondary basis, within the MSS assignment of another MSS licensee. In the Forward Band and Reverse Band modes both MT and BS transmitters will operate within the ICO MSS assignments. In the Uplink Hybrid and Downlink Hybrid modes ICO states that the MT and BS would both transmit in the MSS uplink and

[1] *See Establishment of Policies and Service Rules for the Mobile Satellite Service in the 2 GHz Band*, IB Docket No 99-81, Report and Order, 15 FCC Rcd 16127 (2000) (*2 GHz MSS Rules Order).*

of this section, an MSS licensee is permitted to apply for ATC authorization based on another system architecture.

12. New Section *25.255* is added to read as follows:

§ 25.255 Procedures for resolving harmful interference related to operation of ancillary terrestrial components operating in the 1.5/1.6 GHz, 1.6/2.4 GHz and 2 GHz bands.

If harmful interference is caused to other services by ancillary MSS ATC operations. either from ATC base stations or mobile terminals, the ATC operator must resolve any such interference. If the MSS ATC operator claims to have resolved the interference and other operators claim that interference has not been resolved, then the parties to the dispute may petition the Commission for a resolution of their claims.

1.2 Other Assumptions Used in Technical Analysis

1.2.1 Voice Activation

ICO states that additional factors may reduce the level of out-of-band (OOB) emissions from both the ATC MTs and BS transmitters. In particular, ICO asserts that a voice activation factor of 4 dB,[6] or 40%. is appropriate when dealing with a population of PCS-like transmitters. While the actual value of the voice activations factor will depend upon the level of background noise experienced by the users, typical values do range from 1 to 4 dB.[7]

1.2.2 Power Control

ICO also claims that a power control factor of 4.77 dB is appropriate and conservative to use with a large population of PCS-like transmitters! Other commenters in this proceeding have used values of a power control factor ranging from 2 to 6 dB. Our independent evaluation of terrestrial cellular network power control leads us to the conclusion that ATC networks would incorporate a power control factor of 10 dB, or greater, in sharing analyses for the ATC network.' Several factors that minimize the BS and MT power usage including the following: structural attenuation," BS/MT range variation and body blockage. The purpose of reducing the power usage is to reduce the cell-tocell interference and to prolong MT battery life. Typical structural attenuation factors are on the order of 10 dB or greater; BS/MT range variations are on the order of 6 dB; and body blockage is approximately 2-4 dB. The actual dynamic range of the power control system is expected to be greater than the sum of the individual attenuation factors. We use a 10 dB power control factor for MT transmissions in our analysis of 2 GHz ATC operations. A more detailed discussion of these factors is provided in Appendix C2 1.3.

1.23 Frequency Polarization Isolation

Some frequency polarization isolation will exist between a transmitter and receiver using different polarization schemes. In comments submitted with regard to this proceeding Inmarsat references a value of 1.4 dB for polarization isolation for all cases of linear to circular, non-identical polarization mismatch between a PCS-like transmitter and a satellite transmitter." MSV argued that when considering an ensemble of randomly oriented linear emitters received by a circularly polarized receiver, a value of 3 dB would be more a propriate to use.[12] Because the orientation of the linear transmit ATC antennas will not be truly random,' a more conservative 1.4 dB number proposed by Inmarsat is taken into account in our

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[6] See ICO Jan. 29,2002 *Ex Pane* Letter at *3*.

[7] See *infra* App. C2, L-band Technical App., § 1.

[8] *See* ICO Jan. 29,2002 *Ex Pane* Letter at 4.

[9] *See infra* App. C2, § 1.3 for a detailed discussion on the use of power control in cellular systems.

[10] By "structural attenuation" we mean the signal attenuation that takes place when an MT transmits within a building. automobile or other structure that completely encloses the MT. We differentiate between "structural attenuation" and "outdoor blockage" of the line-of-sight propagation path between a transmitter and a satellite receiver caused by obstacles such as buildings and trees.

[11] Inmarsat Comments at 27.

[12] MSV Reply at 8.

[13] It is expected that the ATC handset antennas will be oriented in some distribution about the local vertical and not have an equal probability of being oriented in all directions.

downlink, respectively. The co-channel compatibility of the ICO ATC transmitters and other MSS systems is not the subject of this appendix. This appendix specifically addresses the out-of-band compatibility between the ICO ATC transmitters and other MSS systems and communication systems operating in frequency allocations adjacent to the MSS allocations.

The ICO ATC proposal provided technical details of a 3G PCS system as a representative ATC system.' The 3G system selected by ICO was CDMA2000. The out-of-channel emission values associated with the CDMA2000 system are shown in Table l.l.A.)

Table l.l.A ICO Proposed ATC Out-of-Band Emission Values

Out-of-Channel EIRP	MT	BS
700-750 kHz offset from center	-53.3 dBW/4kHz	-16.3 dBW/4kHz
>750 kHz offset from center	-93.5 dBW/4kHz	-56.5 dBW/4kHz

Equipment	MSS Uplink Band	MSS Downlink Band
MSS User Terminal in ATC Mode	-67.0 dBW/4kHz	-119.6 dBW/4kHz
ATC Base Station	-67.0 dBW/4kHz	-100.6dBW/4kHz

ICO states that "[t]hese limits should be measured at the transmitter (whether base station or user MT) in the receive band assigned to the adjacent MSS systems. The limits for MSS uplink spectrum are identical to the PCS emission limits in Section 24.238 of the Commission's Rules. The limits for the downlink spectrum are more stringent, in recognition of the fact that ATC operations in MSS downlink spectrum likely represents a greater interference threat to MSS operations."[5] ICO is correct that for a PCS system with a transmit power of 1 Watt, the limiting emission it quotes for the MSS uplink band is consistent with section 24.238. The limits listed for the MSS downlink band are significantly below the level specified by section 24.238.

The limits included in Table l.l.A were used by other commenters to evaluate the potential impact of the proposed ICO ATC system on their systems. The later limits, contained in Table l.l.B, are significantly different than those in Table l.l.A and will be used in our analyses to assess the potential interference between the ICO ATC transmitters and MSS systems in adjacent bands and other systems in adjacent allocations.

[2] ICO Mar. 8,2001 Ex *Pone* Letter, **App.** B at 10.

[3] ICO Mar. 8, 2001 *Ex Pone* Letter, **App.** B at 11.

[4] ICO Apr. 10, 2002 *Ex Pane* Letter **at 2.**

[5] ICO **Apr.** 10, 2002 *Ex Pane* Letter **at** 2.

Boeing submitted initial comments indicating that, based upon a number of assumptions, it is concerned about possible interference from the ATC BS to satellite uplink receivers." However, it indicates that no problem should be encountered from the ATC MT to satellite uplinks. As mentioned earlier, this scenario is an adjacent channel sharing situation, as each MSS system will be assigned its own home spectrum and must operate on a non-interference basis in any other pan of the MSS allocation. The following sections compare Boeing's analysis with our independent analysis.

2.1.2 Interference to Boeing Satellite Receiver from ATC Base Stations

Boeing provides a link calculation which uses a 6% increase in the satellite receiver noise as the interference criteria.[18] The result of the Boeing calculations indicate a positive margin at the satellite of about 5 dB. Based upon this margin Boeing expressed concern about the potential for interference and suggested that an aggregate base station power limit might be appropriate.

The Boeing calculation describes an interference link from a number of base stations at the edge of coverage (10 degree elevation) of the Boeing MSS satellite spot beam. It assumes that there are 500 base stations and that they are located on this 10 degree elevation contour. The third column of Table 2.1.2.A is reproduced from the Boeing Comments and is included for comparison purposes. The Boeing analysis is based upon the satellite being visible at the base station at an elevation angle of 10 degrees and corresponds to a calculated path loss of –186.3 dB as shown in the table. The Boeing analysis also assumes that the mainbeam EIRP of all 500 base stations are coupled into the mainbeam of the satellite receive antenna at the base station mainbeam gain. Based upon the 10 degree elevation angle and a -2.5 degree base station antenna tilt proposed by ICO,[19] the angle between the base station peak gain direction and the Boeing satellite would be 12.5 degrees vertically. Using the reference radiation pattern in ITU-R Rec. F.1336, shown in Figure 2.1.2.A, at 12.5 degrees off axis, the base station antenna can be expected to have about 11.5 dB of gain discrimination from the main beam gain. Additionally, the ATC BS out-of-band emission has been reduced from the -56.6 dBW/4kHz in the initial ICO proposal, and assumed by Boeing, to the value in Table 1.1.A. These two factors combine to increase the calculated margin from the 4.6 dB calculated by Boeing to 26.6 dB as shown in the fourth column of Table 2.1.2.A.

[17] See generally Boeing Comments, App. A.

[18] See Boeing Comments, App. A at 5.

[19] This is typical of CDMA2000 base stations. See ICO Mar. 8, 2001 *Ex Parte* Letter, Annex B at 11

analyses. We believe that these arguments, made with respect to L-band MSS operations, are also applicable to 2 GHz MSS.

1.2.4 Receiver Saturation Level

Some patties have argued that their mobile earth stations (MES) will "overload," or saturate, when exposed to -120 dBW of interfering power within the RF band-pass of the receiver.[14] This level is equivalent to -90 dBm. Other parties have provided measurements of an L-band terminal that showed that saturation did not occur until the input power reached about -45 dBm, some 45 dB higher than -90 dBm.[15] Additionally, some parties have quoted the Radio Technical Committee on Aeronautics (RTCA) as having a standard for -50 dBm for airborne terminals. Given these potential values for saturation we feel that the use of -50 dBm for airborne terminals and -60 dBm for mass produced terrestrial receivers is reasonable. Therefore, we will use a value of -60 dBm in our 2 GHz analyses, except in cases where one of the parties specifically states that it can use a receiver that is less susceptible to saturation.

2.0 Intra-Service (Adjacent Assignment) Interference Analyses

The 2 GHz processing round resulted in the licensing of eight (8) MSS systems in 70 MHz of spectrum. As contained in the 2 GHz R&O,[16] this spectrum will be divided among the licensees who are successful in implementing their systems. Upon the launch of its first satellite, an MSS licensee must declare a portion of the 2 GHz spectrum as "home" spectrum. Each licensee will also be permitted to operate in additional 2 GHz MSS spectrum on a non-harmful-interference basis. Because each MSS systems will operate alone in its home spectrum, intra-service sharing is not a co-frequency sharing situation. There is however, a potential for interference to the MSS systems operating in the adjacent frequency assignment. Boeing is the only MSS licensee that has provided detailed Comments concerning the potential that the ICO ATC system may cause interference to another 2 GHz MSS system. We evaluate the impact that 2 GHz ATC as proposed by ICO would have on Boeing's MSS system.

2.1 MSS Uplink Band (1990-2025 MHz)

ICO has proposed three possible ATC modes that would place transmitters in the MSS uplink band;

(1) Forward Band Mode that would implement ATC MTs in the MSS uplink band;

(2) Reverse Band Mode that would put ATC base stations in the MSS uplink band and

(3) Uplink Duplex Mode that implements both the ATC MT and BS in the MSS uplink band.

The following addresses the potential for intra-service, adjacent channel interference among the MT and BS transmitters in the MSS uplink band.

2.1.1 Analysis of Potential Interference to Adjacent MSS Assignments – MSS Uplink Band

[14] Inmarsat Comments, Technical Annex § 3.3.1. When relevant, we distinguish between mobile earth stations (MES) and mobile terminals (MTs). We use the term "MES" to identify terminals that communicate only with an MSS system. We use the term "MT" to identify terminals that communicate with either the MSS system or its ATC.

[15] See MSV Reply, Technical App. at 14.

[16] *2 GHz MSS Rules* Order, 15 FCC Rcd at 16174-81, ¶¶ 99-116

Table 2.1.2.A - Interference to Boeing Satellite Receiver from ATC Base Station

Parameters	Units	Boeing Analysis	Modified Boeing Analysis
Frequency	(GHz)	2.0	2.0
ICO OOB Base Station Emission	dBW/4kHz)	-56.5	-67.0
Number of Base Stations Visible	(#)	500	500
OOB Reference Bandwidth	(kHz)	4.0	4.0
OOB Emission Density (500 Stations)	(dBW/Hz)	-65.5	-76.0
Satellite Altitude	(km)	20182	20182
Minimum Elevation Angle	(deg)	10	10
Range to Satellite	(km)	24699	24699
Path Loss	(dB)	-186.3	-186.3
Base Station Gain Isolation	(dB)	0	-11.5
Satellite Receive Gain	(dBi)	33.0	33.0
Polarization Isolation	(dB)	0.0	0.0
Interference Density (Io)	(dBW/Hz)	-218.8	-240.8
Satellite Receive Noise Temp	(K)	450	450
Noise Density (No)	(dBW/Hz)	-202.1	-202.1
Interference to Noise Io/No	(dB)	-16.8	-38.8
Io/No Required for 6% Increase in No	(dB)	-12.2	-12.2
Margin	(dB)	4.61	26.61

2.13 Interference to Boeing Satellite Receiver from ATC User Terminals

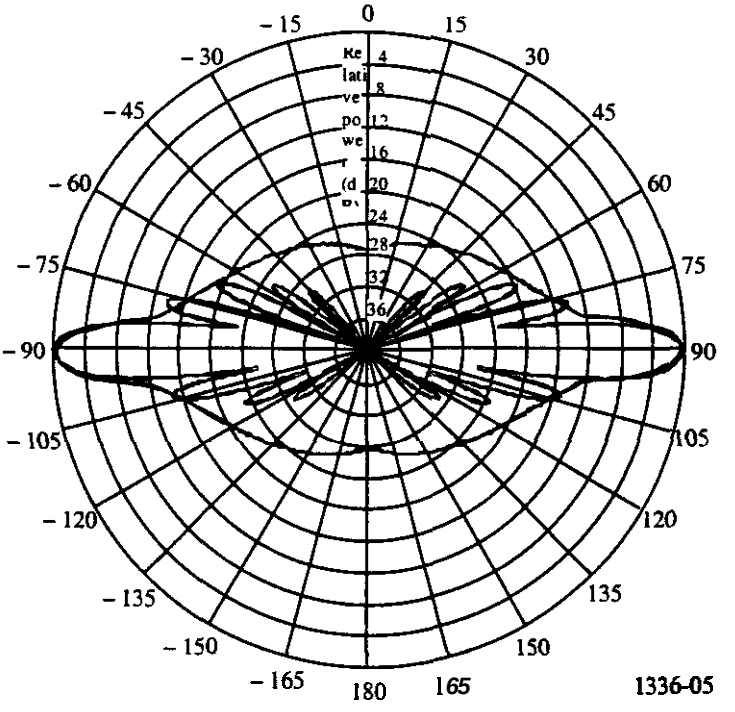
Boeing's initial analysis[21] showed that it did not expect interference problems from ATC MTs in the satellite uplink band. Its calculation assumed 10,000 MTs visible in the Boeing satellite antenna beam. The link calculation predicted a margin of 25 dB at the satellite receiver. However, this analysis was based upon the out-of-channel emission value of –93.5 dBW/4 kHz for the MT contained in the initial ICO proposal. In its latest filing[22] describing out-of-band emission levels, ICO has stated that the out-of-channel emission from a MT in the MSS uplink band would be -67.0 dBW/4kHz. Table 2.1.3.A contains a copy of the Boeing analysis, in the third column, and a similar analysis using the most recent ICO out-of-channel emission values. Incorporated in the right-most column is a 1.4 dB value for frequency polarization isolation, which applies to the case of multiple linear transmitters being received by a circularly polarized receiver. The right-most column of Table 2.1.4.A shows that, using the latest ICO MT out-of-channel values, there is virtually no margin at the Boeing satellite receiver. Therefore, the use of the Section 24.238 emission limitations, alone, for the ICO MT, creates the potential for interference to occur to the Boeing satellite receiver.

[21] Boeing Comments Oct. 19.2001, **App. A,** Table **4.**

[22] *See* ICO *Ex* Pane Letter, **April 10,** 2002 at 2.

Figure 2.1.2.A Antenna Radiation Pattern of Rec. ITU-R F.1336

Comparison of measured pattern and reference radiation pattern envelope for an omnidirectional antenna with 11dBi gao andoperatingin the band 928-944 MHz, $k = 0$



ICO states that it will implement a maximum gain suppression for base station antennas of 25 dB.[20] This value appears to be feasible to meet and is supported by the measured antenna pattern in Figure **2.1.2.A.** This indicates that the link analysis presented in the fourth column of Table 2.1.2.A is conservative. Additionally, no account has been taken of the polarization isolation that would exist between the ICO base station and the Boeing satellite receiver. Boeing's analysis suggests that there should be a limit on the aggregate base station power. According to our analysis, such a limit is not necessary.

[20] ICO **Mar. 8,2001** *Ex Parte* Letter, Annex B **at** 17.

Parameters	Units	Baeing Analysis	Staff Analysis
Frequency	(GHz)	2.0	2.0
Area of Isotope	(dBm^2)	-27.5	-27.5
Noise Temperature	(K)	200	200
Noise Density (No)	(dBW/Hz)	-205.6	-205.6
Interference Criteria Io/No	(dB)	-12.2	-12.2
Number of ICO Transmitters	(#)	1	2
Interference Density (Io)	(dBW/Hz)	-217.8	-217.8
Base Station OOB, Boeing Value	(dBW/4 kHz)	-56.5	
ICO Supplied OOB Value	(dBW/4 kHz)		-100.6
Transmitter OOB Emission	(dBW/Hz)	-92.5	-136.6
Antenna Gain (Boeing User Terminal)	(dBi)	0.0	0.0
Polarization Isolation	(dB)	0.0	0.0
Required Propagation Loss	(dB)	-125.3	-84.2
Required Separation Range	(km)	21.9	0.19
Required Separation Range	(ft)	71.800	630

Table 2.13.A - Interference to Boeing Satellite Receiver from ATC User Terminals

Parameters	Units	Boeing	Staff
Frequency	(GHz)	2.0	2.0
ICO OOB ATC MT emission	dBW/4kHz	-93.5	-67.0
Number Terminal Stations Visible	(#)	10000	10000
OOB Reference Bandwidth	(kHz)	4.0	4.0
OOB Emission Density 10,000 Terminal	(dBW/Hz)	-89.5	-63.0
Satellite Altitude	(km)	20182	20182
Elevation Angle	(Deg)	90	90
Range to Satellite	(km)	20182	20182
Path Loss to Satellite	(dB)	-184.6	-184.6
Satellite Receive Gain	(dBi)	34.8	34.8
Polarization Isolation	(dB)	0.0	-1.4
Interference Density (Io)	(dBW/Hz)	-239.3	-214.2
Satellite Receive Noise Temp	(K)	450	450
Noise Density (No)	(dBW/Hz)	-202.1	-202.1
Interference to Noise Io/No	(dB)	-31.2	-12.1
Io/No Required for 6% Delta T/T	(dB)	-12.2	-12.2
Margin	(dB)		

As shown in Table 2.1.3.A the section 24.238 OOB limits used with Boeing's link budget essentially results in no link margin. This analysis, however, does not include the mitigating effects of ATC power control and voice activation on sharing with the Boeing system. These two factors combine to decrease the average power emitted towards the Boeing satellite receiver by 8.77 dB according to the values for these factors proposed by ICO. Our independent review on the use of power control in ATC networks suggests that a factor of 10 dB or more would be appropriate to use.[23] Incorporating these two factors into the analysis reduces the increase in noise at the Boeing receiver to less than 1% increase in effective receiver noise temperature. This level of interference to the Boeing satellite receiver should be acceptable.

2.2 MSS Downlink Band (2165-2200 MHz)

2.2.1 Analysis of Adjacent MSS assignments (Boeing airborne receivers)

Boeing has submitted comments indicating that it is concerned about potential interference to its 2 GHz downlinks (specifically, from the ATC BS and MT transmitters to Boeing's MSS aircraft receiver). As mentioned previously these scenarios are actually out-of-band sharing situations, because each MSS system will be assigned its own home spectrum.

The next two sections compare the Boeing downlink interference calculations which were performed using the OOB values contained in the initial ICO proposal with a similar calculation using ICO's latest

[23] See App. C2. § 1.3.

2.2.4.1.A below. The analysis indicates that the Boeing MSS receiver will experience saturation if it is within **96** feet of an ICO ATC MT and clearly visible to the MT. It should be noted that our analysis assumes an MT EIRP of one watt, while Boeing assumed -10 dBW.

Table 2.2.4.1.A Saturation of Bwing receivers from ATC MTs

Parameters	Units	Value
Frequency	(GHz)	2.185
Transmit Power	(dBW)	0.0
Boeing Receiver Saturation Power	(dBW)	-80.0
Polarization Isolation	(dB)	1.4
Antenna Gain	(dBi)	0.0
Required Propagation Loss	(dB)	**78.6**
Required Separation Distance	(m)	**93**
Required Separation Distance	(ft)	**305**

[28] **See** ICO April 10, 2002 *Ex* Parte Letter, Attach. C.

[29] **See Boeing** April 5, 2002 *Ex* Pane Letter at 12.

[30] The precise number calculated by Boeing was 2.068 **km.**

(56 ft) for MSS user terminals. The probability of having 6 simultaneously transmitting MTs within 100 feet of an aircraft is small. This is particularly true because MTs in the terminal building would experience building blockage and MTs on the airport tarmac should be operated only by airport personnel. Again, the selected interference criteria of an increase in noise temperature of 6% would not cause significant interference to the Boeing system under transient conditions and this situation should not cause a problem for the Boeing MSS receiver.

Table 2.23.A **- Interference to Aircraft Terminals from** ATC **MTs**

Parameters	Units	Boeing Analysis	ICO MT	ICO MES
Frequency	(GHz)	2.01	2.01	2.0
Area of Isotope	(dBm^2)	-27.5	-27.5	-27.5
Noise Temperature	(K)	200	200	200
Noise Density (No)	(dBW/Hz)	-205.6	-205.6	-205.6
Interference Criteria Io/No	(dB)	-12.2	-12.2	-12.2
Number of Mobile Transmitters	(#)	6	6	6
Acceptable Io (6% noise increase)	(dBW/Hz)	-217.8	-217.8	-217.8
Polarization Isolation	(dB)	0.0	1.4	0.0
Boeing Value for OOB Emission	(dBW/4 kHz)	-93.5		
ICO OOB Value	(dBW/4 kHz)		-119.6	-126.5[24]
Number of Transmitters	(dB)	7.8	7.8	7.8
Out-of-Band Emission Level	(dBW/Hz)	-121.7	-147.8	-154.7
Antenna Gain (Boeing UT)	(dBi)	0.0	0.0	0.0
Required Prop Loss	(dB)	-96.1	-63.1	-63.1
Required Separation Range	(Km)	0.8	0.03	0.02
Required Separation Range				

2.2.4 **Saturation** of **Boeing MSS Receivers**

Boeing has expressed concern[25] over the possibility of both ICO MTs and BSs saturating a Boeing MSS receiver. The Commission's 2 GHz MSS rules require that the MSS transceiver be capable of tuning across at least 70% of the United States 2 GHz MSS allocation." Boeing explains that the MSS receiver needs to tune across the entire available 2 GHz downlink band. This leaves the front end of the Boeing receiver open to the full power of transmitters from the ICO ATC system. Boeing specifically states that it is using a receiver designed to saturate at -80 dBW, or -50 dBm.

2.2.4.1 **Saturation of Boeing MSS Receivers from ICO** ATC **MT**

The possibility of ICO ATC MT interfering with. or saturating, Boeing MES receivers can only occur in ICO Reverse-Band or Downlink-Hybrid Modes. Boeing's analysis of ATC MT" is reflected in Table

[24] Out-of-band emission from an ICO **MSS** terminals are identified in 47 **C.F.R.** § 25.202(f).

[25] Boeing Supplemental Comments at 10

[26] *See* 47 C.F.R. § 25.143(b)(2)(ii)(2001).

[27] See Boeing April 5,2002 *Ex* Pane Letter at 11

Table 2242B Calculation of Necessary Separation Distance for Typical Handheld MSS Receiver

Parameters	Units	Value
Frequency	(GHz)	2.185
Assumed Saturation level	(dBm)	-60
Conversion dBm to dBW	(dBm)	-30
Assumed Saturation level	(dBW)	-90
Receive Antenna Gain	(dBi)	0
Isotropic Antenna Area	(dBm^2)	-28.2
Power Flux at Saturation	(dBW/m^2)	-61.8
Base Station Height	(m)	30
MSS Terminals Height	(m)	1.5
BS Tilt Angle	(Degrees)	-2.5
BS Off-Boresight Angle	(Degrees)	1.7
Mainbeam EIRP	(dBW)	27
BS Antenna Discrimination	(dB)	-11.2
EIRP towards MSS Receiver	(dBW)	15.8
Range to MSS Receiver	(m)	2148
Path Loss	(dB/m^2)	-77.6
Power Flux at MSS Receiver	(dBW/m^2)	-61.8

We agree with Boeing that, in areas in which free-space propagation is the dominant mode of propagation, the ATC BS should observe a separation distance to protect MSS receivers from possible saturation. For a -2.5 degree BS antenna tilt, the separation distance would be about 2 km. Alternately, the BS could be implemented in a way to reduce the area in which the power flux is greater than -61.8 dBW/m^2.

In many urban areas free-space propagation will not be the dominant mode of propagation. Some parties to this proceeding have used free-space loss to determine the expected attenuation from the ATC BS to a MES. Others have used the Walfisch-Ikegami (WI) propagation model which typically results in a higher attenuation for the same case. The WI model is based upon the expected propagation loss in an urban/city setting that consists of relatively tall buildings. The National Institute of Standards and Technology (NIST) has developed a computer program that compares a number of different propagation models including the WI model. Using the NIST software," propagation loss values for a 1 km path of 136.4dB are calculated from the Hata-city model, 131.4dB from the CCJR (now ITU-R) model and 171.7dB is calculated from the WI non-LOS model. All of these predicted losses are well above the 105.2dB total free space losses[32] resulting from Tables 2.2.4.2.A and Table 2.2.4.2.B. Based upon the values calculated by the NIST software, sufficient loss appears to be available in urban settings to prevent the saturation of MSS receivers in these environments.

[31] See National Institute of Standards and Technology, Wireless Communications Technology Group, *General Purpose Calcirlatorfor Oirtdoor Propagation Loss. available ar* <http://w3.antd.nist.gov/wctg/manet/prd_propcalc.html> (last visited, Jan. 30,2003) (offering propagation software).

[32] In Tables 2.2.4.2.Aand 2.2.4.2.B the free space loss is the sum of the path loss and the isotropic antenna area

provides a reference antenna pattern that can be used near the mainbeam of the BS transmitter. If the Boeing MSS receiver is assumed to be mounted on the top of an aircraft (7.5 m off the ground) and the ATC BS tower is 30 meters high, then the distance at which the receiver saturates will depend on the tilt angle of the BS antenna. Table 2.2.4.2.A shows the distance at which saturation would occur for a -2.5 degree downtilt of the BS antenna.

Table 2.2.4.2.A shows that the power flux of -51.8 dBW/m^2 is equivalent to the Boeing saturation level of -50 dBm. The lower part of the Table shows the distance required for the power flux from the ATC base station to drop-off to -51.8 dBW/m^2. For a BS antenna tilt of -2.5 degrees, the tilt angle proposed by ICO, the power flux will be at -51.8 dBW/m^2 approximately 1126 m from the antenna.

Table 23.4.2.A Calculation of Necessary Separation Distance for a Boeing MSS Receiver and ICO BS

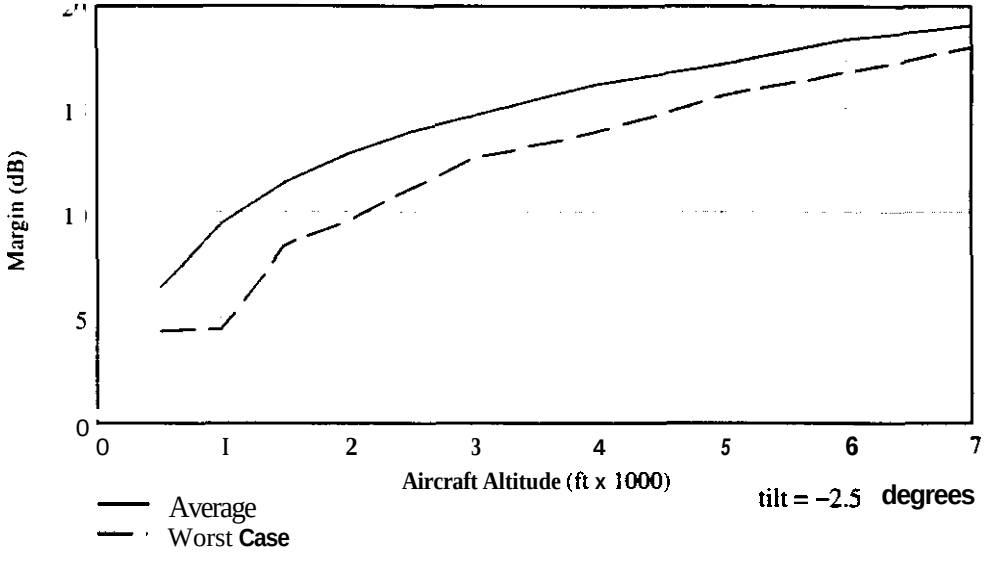
Parameters	Units	Value
Frequency	(GHz)	2.185
Assumed Saturation level	(dBm)	-50
Conversion to dBW	(dBm)	-30
Assumed Saturation level	(dBW)	-80
Receive Antenna Gain	(dBi)	0
Isotropic Antenna Area	(dBm^2)	-28.2
Power Flux at Saturation	(dBW/m^2)	-51.8
Base Station Height	(m)	30
MSS Terminals Height	(m)	1.5
BS Tilt Angle	(Degrees)	-2.5
BS Off-Boresight Angle	(Degrees)	1.36
Mainbeam EIRP	(dBW)	21
BS Antenna Discrimination	(dB)	-6.8
EIRP towards MSS Receiver	(dBW)	20.2
Range to MSS Receiver	(m)	1126
Path Loss	(dB/m^2)	-12.0
Power Flux at Boeing Receiver	(dBW/m^2)	-51.8

Performing the same calculation for a "hand held" MSS receiver with a more typical saturation level of -60 dBm produces the calculations shown in Table 2.2.4.2.B. In this case the MSS receiver is 1.5 m high while the BS antenna is modeled as being 30 m high. The separation distance for the BS antenna tilt angle of -2.5 degrees is over 2 km.

2.2.4.3 Potential Saturation of Airborne 2 GHz receivers

A potential problem discussed by the parties at L-band is the possibility of the saturation of an airborne MSS receiver from multiple BS transmitters. This same problem could potentially occur at 2 GHz between the Boeing MSS and the ICO BSs because the Boeing MSS receivers, like the L-band Inmarsat receivers, are utilized on board aircraft. A MathCad model was written to analyze this situation. The model is included as Attachment 1 to this Appendix. The model randomly distributes a number of base stations across the area visible to an aircraft at a given height. The base stations, assumed to be on thirty-meter towers, use antennas with mainbeam patterns based upon Recommendation ITU-R F.1336. The antenna roll-off is continued to 25 dB down from the mainbearn gain to represent the antennas that ICO has stated it will use. The mainbeam EIRP of each BS is 27 dBW. The MSS receiver is conservatively assumed to have a gain of 0 dBi toward all of the BSs. The total cumulative power received at the MSS terminal is calculated based upon the random distribution of a population of 1000 BS transmitters. This total received power is compared with Boeing's -50 dBm saturation level and the difference between the total received power and the saturation level is used to calculate a saturation margin. If the margin is positive, the MSS receiver is receiving an interfering signal power level insufficient to cause saturation. The program runs 100 trials of 1000 randomly placed BS and plots both the average margin over the 100 trials and the single worst case margin. Figure 2.2.4.3.A shows the average and worst case margins as a function of the aircraft altitude for a BS tilt angle of -2.5 degrees.

Figure 2.2.43.A Modeled Average and Worst Case Saturation Margin for Boeing Airborne MSS Terminal



As presented in Figure 2.2.4.3.A the worst case margin, shown as a dashed line, is always positive indicating that the Boeing MSS receiver would not saturate. The results of this analysis indicate that a relatively large deployment of ATC base stations would not cause Boeing's airborne MSS receivers to saturate while airborne and the potential for this type of interference is low.